THE

JOURNAL OF GAS LIGHTING.

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. XV. No. 361—18th YEAR.] LONDON, AUGUST 21, 1866. [Subscription per Ann. { 15s. in Advance / 18s. Credit } DOUBLE No. Price 1s.

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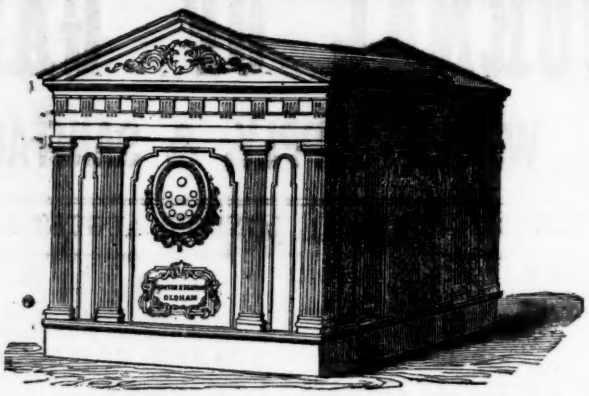

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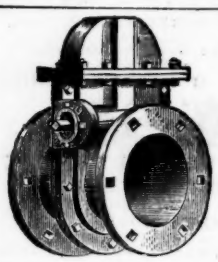

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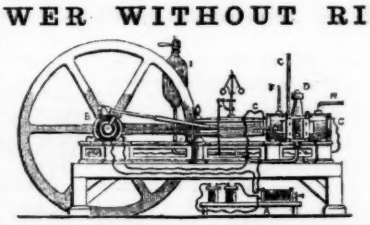

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TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

A Subscriber.—*Notices of the processes for the manufacture of sulphate of ammonia may be found in Muspratt's "Dictionary of Chemistry," Ronald and Richardson's "Chemical Technology," and the "Chemistry of Gas Lighting"—the latter published at* 11, *Bolt Court, Fleet Street, London.*

NOTICES.

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THE JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, AUGUST 21, 1866.

Notes upon Passing Events.

The presence of the cholera has revived the water question, and although the state of the money market forbids any speculation on the gigantic scale suggested by rival engineers, it would be absurd to doubt that the idea of obtaining a limitless supply from some source of unquestionable purity has taken root in metropolitan opinion, and is likely to assume an active shape whenever financial and legislative circumstances are favourable. Whatever happens, it is quite certain that vested interests will be respected, and that the water companies, which have sunk millions to meet modern demands, and to ameliorate conditions that have been the result of growing population and growing trade, will have to be settled with, and their works made useful under any possible arrangement for a new water supply. It is, however, only reasonable to contemplate the time when money will be considerably under 10 per cent.—when the accumulated savings of the nation will be bursting for investment which the railroads remaining to be made will scarcely afford—when the Metropolitan Board, having finished the main drainage and the embankments on both sides of the Thames, opened the new thoroughfare to the Mansion House, and stirred the City into undertaking the proposed street from Holborn Viaduct to Shoreditch, will want some other great work to occupy its energies and increase its importance, in addition to those small obscure details in regulating shop architecture and house drains, which it does so slowly if not ill. Then it is very likely to take up the water question, and then it will find half a dozen plans ready to its hand. It is not long since we analyzed Mr. Bateman's scheme for tapping and collecting the springs and rainfall of the hills that feed the Severn. Putting cost on one side, serious objections were raised to the probable colour of the bog-stained waters. Now Mr. Hemans, lately Mr. Bateman's coadjutor in the Essex Reclamation and Sewage Irrigation Company, has produced a rival scheme on a still more gigantic scale, seeking his supply in the lakes and almost perpetual rainfall of Cumberland, at a cost of ten millions! Ten millions is quite as good a round sum as any other. It is the business of engineers of Mr. Hemans' character to commence schemes if they can, and leave the rest to Providence. In dull times a progressive engineer must keep his name before the public, and an aqueduct from Cumberland to London is even better for that purpose than a tunnel under the Straits of Dover. The essential points for a scheme which will take at the best ten years to hatch, are, that the quality of the water is supposed to be beyond reproach, notwithstanding lead-mine drainings, and the supply ample. In these times the construction of viaducts, aqueducts, and tunnels are within the

A B C of engineering skill. The funds and the parliamentary influence created by public opinion are the materials wanted for commencing one of these great water powers. If some established water company, spurred by ambition and worried by criticism on its supplies, were to endorse one of these mountain-top ideas, then the subject would demand grave consideration. In the meantime there are two points which must be again and again pressed on parish authorities and water companies: first, that as house-to-house supply is impossible as regards a large amount of cottage property, it is of the utmost importance that public supplies should be opened, to supersede the poisoned pumps, in all the poorer streets. These "conduits" need not be constantly running to waste, but be open twice a day, and especially on Sundays, under the charge of a turncock or properly appointed water officer, just as in frosts, when private cisterns are frozen up. It would be easy to have 10 or 20 taps running at once if needed—to be turned on at the hours suited to the habits of the labouring classes. In times like these there should be no excuse in want of water for want of cleanliness. A public institution should replace the old parish pump, and supplement the drinking-fountain. The parish authorities have been active in cleansing operations. We hear that all the small scavenger contractors are in full work, under the orders of the much abused and often pelted health inspectors. We hear of six cartloads of cholera-patient bedding burned in one parish.

There is another suggestion of ours worth repeating—viz., that the managers of baths and wash-houses should sell tickets by the dozen for distribution. There could be no more unexceptionable charity than the bestowal on a poor family of tickets for bathing and for washing clothes. Lord John Manners might immortalize himself, in a manner agreeable to his amiable character, by establishing in the many suitable districts round London bathing-places—an unexpensive screen would often answer every purpose. On the banks of the Serpentine a mound would shelter part of the water, and add to the beauty of a park which is too flat and too straight. But after every possible suggestion for improving the water drinking and washing of the metropolis, common sense always comes round to the necessity of the *abolition of cisterns and the introduction of the constant supply system* in all houses where a supply of water is possible. The alarm created by the presence of cholera has induced many to filter all the water used for domestic purposes through animal charcoal, as recommended by Dr. Frankland, and has caused a very general cleaning-out of cisterns in houses of a superior class, and the discoveries have been alarming of animal and vegetable nastiness. What must be the state of the wooden casks in poor cottage property? The water companies should take example from the dead-set made against gas companies, and go before, instead of waiting for an overwhelming tide of opposition.

The Hyde Park riot has taken place most opportunely for Lord John Manners, if he uses his opportunity. Park Lane is to be widened as far as the park goes; the Duke of Cambridge's house must follow when it is reduced to the sole obstacle. But another suggestion has been made well worth consideration—to turn the park side of the Bayswater Road into a sort of boulevard, by taking the new line of railing within a border of trees, and so leaving a shaded ornamental walk next to the road, as has been done on a short scale in Birdcage Walk.

Trees are necessarily scarce in the City, but they may be agreeably retained and multiplied if the disused churchyards could be treated as open spaces for the use of the public. Bunhill Fields is likely to pass into the hands of the Corporation. Within four walls, and given up to weeds, its use is reduced to a Paradise for cats. But if tablets to the memory of the remarkable persons buried there were arranged on a good architectural design, and the rest of the space planted at the sides, with the centre open and asphalted, as a City playground and drill-ground it would be no dishonour to the dead, and a great benefit to the living. Other burial-grounds have been cut through for streets—St. Pancras churchyard is to be part of a railway-station—therefore it is too late for a cry of sacrilege. Smaller burial-grounds, first concreted over to guard against any possible miasma, might also be thrown open. Bishopsgate Church has been refreshed by flowers at the cost of a single public-spirited parishioner. It would be well if the dean or canons of St. Paul's, or whoever may have the authority, would take that dank and dreary yard in hand, and make it, if not open to the public, more like "God's acre." We cannot do much for the labouring poor against their will; but to supply them with clean water and playgrounds for their children in the crowded City would be worth doing.

At a time when the map of Europe has within a few weeks been completely altered, and a second-class power has risen suddenly into the character not only of a first-class, but a first-class military power, it is rather interesting to note the changes that have taken place in that France which two months ago was by general admission the first military power in Europe. It was long the boast of Frenchmen that "France was a "soldier." And this was true, as long as France had no external trade and was composed mainly of peasant proprietors, to whom a change from the spade to the musket, from potato diet and linen blouse to meat and a warm cloth jacket, was a great social rise. Then France prided herself on being self-sustaining, and needing nothing from the foreigner but what she took by force. Michelet, in one of his rhapsodies, paints the French peasant unable to compete in railroad work with the English navvy, because "he often paused and thought of "his father who was a soldier and conqueror in every capital "of Europe," which, of course, made him intellectually superior to the Englishman who only thought of rising to be a sub-contractor and settling on a farm, or perhaps of an extra pot of beer. But time and peace have brought trade, and trade has brought money. More recently, Imperial finance and Imperial treaties of commerce have given every man in France who has saved anything an interest in the steady rising profits of commerce only possible in a time of peace. Hence we find doctrines, familiar to us here, but startling in the mouth of a Frenchman, in an article by Monsieur Bordel on the financial condition of Europe, written before Prussia had made a clean sweep of Northern Germany. From a table he gives of the comparative export trade of England and France in 1863, we find that, in round numbers, France had about half the exports of England to Russia, one-third to Sweden and Norway, one-sixth to the Hanseatic towns, one-fifth to Holland, four times as much to Belgium, and about equal to the Zollverein and Hanover, double as much to Spain, one-third to Austria, half to Turkey and Persia, one-third to Egypt, one-fourth to the United States; but to India, China, Cochin China, Siam, Japan, and Australia, including Oceana, not one twenty-fifth of the British trade. "Unfortunately," he observes, "the great majority of our population are indifferent to "and quite unaware of the extreme importance of foreign "commerce. In order to make progress in this direction, our "country must modify its tastes, its habits, its legislation. "The other day we were a military nation—commercial France "is a creation of yesterday, and has not yet organized the "essentials of success. Modern France must abolish all the "ignorant laws which hamper the production and distribution "of wealth. First we must abolish our navigation laws, for "all the taxes and regulations which are imposed on merchant "shipping increase the cost of transport, and consequently the "gross price of merchandize. Hence artificial dearness, which "profits no one since all must suffer from it. Next, the law "of September, 1807, which limits the interest of money, must "be abolished. Money cannot be kept at 5 per cent. in France "when perhaps at Bombay it is worth 15 or 20 per cent. "New and liberal laws promoting mercantile companies are "also needed." When such sentiments are published in one of the principal French reviews, it is easy to understand that France is less willing to war for glory than in the old revolutionary times. Still, neighbours must not venture to insult her.

The fifth report of the Children's Employment Commission affords grave subject for consideration, not only for Ministers of State and the legislators of both Houses who will have to act upon it, but for those parties who believe that handing over the balance of political power to the working classes would improve the general course of practical legislation. The working classes, under the influence of diffused elementary education, have shown remarkable strength and union in all questions affecting wages. They now move as one man in strikes, and they are not to be blamed for trying to take advantage of the demand for labour. Where they are to be blamed is for cruelty and tyranny to non-society men, and for opposition to machinery, as at Sheffield. It is quite certain that preaching and lecturing by those who are of the employer class would be a mere waste of time. It is well known to those who have mixed amongst the

Reform Leaguers, that Professor Fawcett and Mr. (Tom Brown) Hughes have lost caste as "robust politicians," since they ventured to condemn the secret vengeance with which file-makers and scissor-grinders intimidate those who resist their trade rules. There are four questions which demand the earnest and continued attention of the Legislature—first, the abolition of unhealthy dwellings; second, the provision of fit shelter and medical attendance for the sick, maimed, and infirm aged poor, so often prematurely worn out by unhealthy labour; third, the restraint of the excessive labour of young children; and fourth, the provision of elementary education, extending specially to the most destitute classes in the poorest neighbourhoods. We know that it may be argued with a certain foundation of truth, that labouring men should provide in health for sickness and old age, and that workhouses and hospitals encourage improvidence; that sober industrious men should not be taxed to educate the children of the drunken or idle; and there is a school of exceeding abstract self-called liberality in political matters, who maintain that children should be left entirely to the mercy of their parents, to work where and for what hours they please. But the wiser statesmen of all parties are agreed that the highly artificial condition of the people of this country, especially in great cities and manufacturing towns, requires exceptional legislation; that no matter whose the fault, the nation cannot afford to breed disease and crime in filthy crowded dens—to make temporary sickness chronic by want of care—and to leave children under the sole care of thoughtless selfish employers and greedy parents seeking work and wages at the sacrifice of body and soul. It is a significant fact, well worth the attention of Mr. J. Stuart Mill and the advanced school of politicians, that the powerful organization of trades unions, which interferes so often, and often so unjustly, with apprenticeship, has never taken one step toward limiting the hours of childrens labour; much less have they, collectively or individually, assisted educational reformers, or taken one step on the question of workhouse infirmary reform, where the labouring classes are really all-powerful. For the publicans, who control most of the parochial and ratepayers associations, with other small tradesmen, have their chief customers amongst the working classes. The journeymen printers in their union are almost all-powerful. Let us see what the commissioners say about the printing trade, which, with bookbinders and wholesale stationers, as regards juvenile labour, are in a most discreditable condition—discreditable to employers, but also discreditable to the printers union and the adult handworkers, who must be more or less nearly connected with the young slaves. In England, in 1861, there were 30,171 male and 419 females engaged in printing-offices; 2760 were boys under 15 years of age; 4000 under 18; of girls, about 100 were from 10 to 18 years old. Printing-offices, with their composing-rooms, machine-rooms or cellars, and reading-closets, say dens, are usually "crowded, "ill-ventilated, dirty, and unhealthy, and present a striking "contrast to the few exceptions that exist. Overtime and "nightwork for boys under 15, and even 13, are constantly "carried to an excessive extent." Instances are given in Mr. Lord's report, which any one of any experience would find not remarkable, "of a boy, not 13, who for two months or more "up to last Christmas stayed every night, except Saturday, "from seven in the morning until ten at night, and once a "week worked all the night through, and then came to work "again at eight in the morning. Another, aged 13, had "worked all night through seven or eight times in the months "of November and December; twelve hours and fifteen "hours nightwork for boys under 13 is not uncommon." These long hours are not confined to London. In Liverpool, the ordinary work of one establishment is supposed to be 59 hours for each week, but 20 hours overtime are common, and occasionally it has reached 30 hours. A machine-boy has little rest; the machine grinds on. Mealtimes are irregular, and of course education must be low when work and sleep are continuous. Employers, masters, workmen, parents, all are to blame for this unnatural state of existence, which sows the certain seeds of premature decay; but "nothing short of legislative interference will keep the "hours of work within such limits as will leave the boys fairly "healthy for town boys, and allow them a chance of reaching "manhood with a constitution not wholly ruined." The bookbinders employ a great number of women and girls between 13 and 18 years of age. Overtime is common, and "costly "to all concerned. If they would all come at eight in the "morning, and work steadily all the day, it would be seldom "necessary to work after eight in the evening." Mr. Warren Delarue managed to discourage overtime by not paying the foreman anything for it, "consequently he does all he can to "get every one out of the place at the regular time." The book trade of Manchester employs more than 2000 females, usually apprenticed under the age of 15, who are exposed to great temptation in consequence of the long and late hours of work, want of education, and early independence of parental control. Manchester swarms with philanthropists, members of the Peace Society, the Aborigines Protection, and every other friend-of-man society; there is a case for them, without going to Jamaica or Kaffir Land, and for making amends for their opposition to the Factory Act. Wholesale stationers work the very young very long. Out of 40 boys in one room not one could read. Here the education clauses of the Factory Act are wanted. Bristol seems favourably distinguished for the care and education of working children. At the Avonside Works overtime is discouraged, and the Saturday half-holiday has been granted. In the white-lead works, baths are provided—a matter of great importance in such an employment. At the chocolate and cocoa manufactory of Messrs. Fry, the rooms are airy and cheerful, cleanliness prevails, and education is encouraged. The ribbon trade of Coventry and its neighbourhood requires regulation. The boys work under their parents long hours and all hours; they begin to turn wheels at ten, and work up to thirteen and fourteen. The work is permanently injurious to health, and very improper for boys. Some are employed as early as seven and eight. Amongst the Irish grievances which no patriot has as yet fathered are the flax "scutching-mills." Every season, in autumn, persons wholly unaccustomed to machinery are taken from field labour to feed the rollers; the consequences are numerous accidents of the most frightful description. Brick-fields are worked by a set of labourers in their habits little, if any, better than savages; but we must reserve a notice of the barbarous treatment to which children of both sexes are subject in this employment to another occasion. We may remark that legislative modesty is confined to towns. It is a crime for little boys to bathe in canals round London; but there are many trades, like brickmaking, where girls as well as boys work more than half naked, and where womanly modesty is impossible.

GAS LEGISLATION OF 1866.

Of the 53 gas Bills presented to Parliament at the commencement of the present session, 18 either failed to obtain the sanction of the Legislature or were withdrawn; so that the actual number of Acts passed relating to the supply of gas was less than during the preceding session. Pursuing the plan we adopted on former occasions, we subjoin abstracts of the various Acts, classing them in groups; comprising, in the first place, those Acts which give additional powers to companies previously authorized by Parliament; secondly, those for the incorporation of companies that have hitherto carried on their operations without parliamentary powers; thirdly, Acts giving power to private individuals to form companies to purchase existing works; fourthly, Acts obtained by public bodies, giving them additional powers for the supply of gas; and, lastly, Acts for the establishment of competing companies. The principal alterations made by the committees by whom the Gas Bills were considered, have been noticed in the following abstracts:—

The first group comprises 12. The *Belfast Gas Act* merely gives the existing company power to purchase additional land adjoining their works. The only alterations made in the Bill were the limitation of the power to purchase to two years instead of five as proposed, and the addition of a clause making it requisite to give eight weeks' notice before taking houses occupied by the labouring classes.

The *Brighton and Hove Gas Act* presents in many respects a strong contrast to the Bill as originally introduced. The Brighton and Hove General Gas Company applied for power to raise £150,000 additional capital, and to borrow £40,000; to add the parishes of Old Shoreham and Lancing to their district; and to purchase 10 acres of additional land. The maximum prices for 12-candle gas were proposed to be 5s. per 1000 feet in New Shoreham, 4s. in Brighton and Hove, and in other places 6s. The Act gives the company power to raise not more

than £75,000 additional share capital, the increased borrowing power being limited to £25,000. The new shares are to be sold by auction, and the dividends are limited to 7 per cent. on ordinary shares and to 6 per cent. on preference shares. The accounts of the company are to be audited by special auditors appointed by the Corporation, and to be published in the local papers. The price of gas is not to exceed 3s. 6d. per 1000 feet in any place within the limits of the company's former Act, except the Upper Shoreham Road, where the price is to be 4s.; and in any other parish 5s. The illuminating power of the gas is to be raised to 14 candles; and it is to be so far free from sulphuretted hydrogen as not to discolour moistened test-paper, imbued with acetate or carbonate of lead, when exposed for one minute to a current of gas issuing under a pressure of 5-10ths of an inch of water. At the option of the council of the borough the illuminating power of the gas may be raised to 15 candles, in which case the company may charge 3s. 9d. per 1000 feet. The public lamps are to be supplied at the lowest price charged to any private consumer, and, if the local authority require that it shall be supplied by meter, the average indication of one meter to every 15 lamps is to be deemed sufficient, "a proper regulating appa- "ratus and burners" being provided by the company for every lamp, to ensure uniformity. The limits within which the company may supply gas are extended to the parishes of Old Shoreham and Lancing. The sections of the Gas-Works Clauses Act, with respect to the provision for guarding against fouling water, are to include the sea; and the company are to cease to manufacture residual products at Hove. It is provided, also, that the company shall not, excepting in cases of necessity, open the streets for laying down mains between the 31st of July and the 1st of February in any year without the consent in writing of the clerk to the local authority; and every fireplace or furnace of the company is to be so constructed as to consume its own smoke.

The first enacting clause of the Act of the *British Gaslight Company, Limited* (Staffordshire Potteries), fixes the maximum price of gas at 3s. 6d. per 1000 feet, the illuminating power being 14 candles. The public lamps are to be supplied at the lowest price charged to any private consumer, and the sum to be paid to the company for lighting, extinguishing, cleaning, and repairing the lamps, is to be 13s. per lamp. The gas may, at the option of the lighting authority, be supplied by meter, one meter being fixed to every twelfth lamp. It is provided that "a proper self-acting pressure-regulator" shall be fixed to every lamp, to secure uniformity of consumption, and that the gas shall be permitted to pass unrestrictedly to and from such regulating apparatus. The illuminating power of the gas is to be tested at a distance of not less than 1000 yards from the works; and it is specified that the burner shall be a metal Argand, having an external diameter of 1·10 of an inch and an internal diameter of ·50 of an inch, and with a 7-inch chimney supported upon an ordinary gallery without a perforated disc. The gas is not to contain more than 20 grains of sulphur nor more than 5 grains of ammonia in 100 cubic feet. In estimating the amount of sulphur Dr. Letheby's test is to be employed. Accounts of the company's affairs, according to a prescribed form, are to be published annually in the local paper. The rent to be charged for gas-fittings is not to exceed 10 per cent. of the cost, in addition to a reasonable charge for fixing. No notice need be given for testing the gas at any hour between three in the afternoon and twelve at night. There is scarcely any difference between the Bill introduced and the Act as passed.

By the *Canterbury Gas and Water Act* the name of the "Canterbury Gaslight and Coke Company" has been changed into that of the "Canterbury Gas and Water Company." Their original share capital of £22,500 is converted into stock of the same amount, and they have power to raise £20,000 new capital for their gas undertaking, and £30,000 for the purposes of their water undertaking, to be called A and B shares respectively, it being provided that the shareholders may separate the gas and water undertakings, or carry them on jointly. The dividends on the new capital are limited to 8 per cent., and the company are authorized to borrow £9000. The total quantity of land to be held for the gas undertaking is not to exceed 3 acres. The maximum price for 14-candle gas is to be 4s. per 1000 feet, unless the price of coals shall exceed 20s. per ton, in which case the company may charge 4s. 6d. The purity of the gas is to be ascertained by test-paper. There is no material variation between the Act and the Bill as introduced into Parliament.

The *Croydon Gas Act* empowers the company to increase their present capital of £40,000, by the issue of shares to the amount of £78,000; the dividends on the new capital being limited to 7 per cent. on ordinary shares, and to 6 per cent. on preference shares. The limits of the company's district are extended to comprise the parishes of Addington, Beddington, Coulsdon, and Sanderstead; and they are authorized to purchase 20 acres of land at Waddon, to which place their works are to be removed—it being provided that they shall not construct any works for the storing of gas, except on the land specified, within 300 yards of any dwelling. The maximum price of 14-candle gas is to be 5s. per 1000 feet; three hours notice to be given before testing. There is no clause respecting the purity of the gas. The supply to the public lamps is to be "for such price, upon such terms, and during such hours, as "shall be settled by agreement between the company and the "Local Board." In the Bill promoted by the company, 6s. per 1000 feet was the maximum price named, and the illuminating power 12 candles.

Two Acts were passed respecting the lighting of Dublin with gas, which have for their objects, first, the amalgamation of the Alliance and Dublin Consumers Gas Company with the Commercial Gas Company of Ireland, Limited; and secondly, the purchase by that amalgamated company of the gas-works in Dublin of the United General Gas Company. The amalgamated company bears the original name of the Alliance, and it is specified that the company shall, "with respect to their "undertaking, gas-works, property, and effects, and all mat- "ters connected with the same respectively, represent the "Alliance Company and the Commercial Company respec- "tively as if these two companies respectively and the com- "pany had originally been and had continued without inter- "mission to be one and the same body corporate." The shareholders of each company are, however, to be exclusively entitled to the dividends on their respective undertakings up to the 31st of December next. The capital is to consist of £190,000 in respect of the capital of the Alliance, and £100,000 in respect of the capital of the Commercial, together with a sum, not exceeding £300,000, of new capital authorized to be raised by the Act. The 1900 £10 shares of the former company are to be deemed paid up to the extent of £8 a share, and the 10,000 £10 shares of the Commercial Company are to be deemed paid up to the extent of £5 a share, and they are to be vested in the holders of the shares before the passing of the Act. The illuminating power of the gas at a distance of 1000 yards from the works is to be equal to 16 uncased sperm candles, and it is not to contain more than 20 grains of sulphur in 100 cubic feet. The maximum price of gas in Dublin, and the surrounding townships as far as Kingstown, is to be 4s. 6d., and beyond those limits 5s. 6d., per 1000 feet. A schedule to the Act contains the heads of the agreement between the amalgamated company and the United General Gas Company, for the purchase of the undertaking of the latter company by valuation; Mr. Barlow being named the valuer on behalf of the amalgamated company, and Mr. Hawksley on the part of the United Company. It is specified that the transferred premises, with the exception of book debts, gas-rents, unapplied materials, &c., shall be valued at not less than £240,000 and not more than £270,000. The Act of the United General Gas Company (Dublin) repeals the Acts by virtue of which the Company have supplied Dublin with gas, and restricts the works of the company to Limerick. It then authorizes the transfer of the works in Dublin to the amalgamated company, in part consideration of which the latter are to deliver to the directors of the United Company certificates for 13,500 fully paid-up shares of £10 each, to be distributed among the shareholders at the rate of one share and a half of the amalgamated company for each share of the United Company. The United Company are authorized to raise £10,000 by the creation of new shares, of which sum £4000 are to be applied towards compensation to such officers and servants of the United Company whose services may not be required by the amalgamated company. The Bill, as introduced, contained 71 clauses relating to the general powers of the company, but the Act has only 17 clauses, which relate almost exclusively to the transfer of the Dublin undertaking to the amalgamated company.

The third Bill promoted by the Imperial Company, after the

two first had been rejected, was passed. The *Imperial Company's Act* merely authorizes the company to raise £325,000 by the issue of new shares, and to borrow one-fourth of that amount; the dividends on the new shares being limited to 7 per cent.

The *London Gaslight Act* authorizes the London Gaslight Company to increase their capital of £550,000 by the creation of new shares to the amount of £300,000, the rate of dividend on the new ordinary shares being limited to 7½ per cent., and on preference shares to 6 per cent. It is provided that if, by any Acts hereafter passed, any four or more of the metropolitan gas companies are required to reduce the price or increase the illuminating power of the gas, the London Gaslight Company shall reduce the price of their gas or increase the illuminating power accordingly.

The *Newark Gas Act* authorizes the company to capitalize £5000 expended on the works, the dividend on which is limited to 5 per cent., and also to raise, by the creation of new shares, £15,000 with limited dividend of 7 per cent., making the capital of the company £25,000. The price of 14-candle gas is not to exceed 4s. 6d. per 1000 feet, and the supply to the public lamps, by average meter indication, is to be charged at the lowest rate to any private consumer. It is specified that no mains in any street shall be laid at a less depth than 24 inches. The maximum price named in the Bill was 5s. per 1000 feet, and the illuminating power 12 candles. The clause respecting the depth of the mains was added in committee.

The *Sheffield Gas Act* recites in a long preamble the financial condition of the Sheffield United Gaslight Company, the capital of which is £344,053 10s., and it gives them power to raise by additional shares £350,000. The prescribed dividends on the new capital are limited to 7 per cent. so long as the charge for gas exceeds 3s. 3d. per 1000 feet; 7½ per cent. when the price is 3s. 3d. and not less than 3s.; 9 per cent. when the price is less than 3s.; and 10 per cent. when the price charged for gas shall be 2s. 9d. per 1000 feet and under. The company are authorized to purchase 50 acres of additional land, with the restriction not to store gas within 300 yards of any dwelling-house without consent, and their district is extended. The illuminating power of the gas is to be 15 candles, two hours notice being required before testing. The proportions between the price charged for gas and the dividends were added in committee, also the standard of illuminating power and the regulations for testing the gas.

The *Stourbridge Gas (Amendment) Act* empowers the Stourbridge Gas Company to raise £12,000 additional capital, with a limitation of dividends to 7½ per cent. The company were authorized by their Act of 1854 to raise £12,000 and to borrow £3000; but, instead of borrowing, they raised the whole amount by the issue of shares. The price of gas is not to exceed 4s. 6d. per 1000 feet; and, with regard to the illuminating power, it is specified that inasmuch as part of the district is a mining district, and the pipes are liable to be broken by the sinking of the ground, and losses may be sustained by the escape of gas, "therefore" the gas supplied by the company shall be equal in intensity to 13 candles. Six hours notice are to be given before testing. The company are to adopt any system of accounts which may be prescribed by Parliament or by the Board of Trade. All the clauses relating to the limitation of dividends, the price of gas, and its illuminating power, were added in the committee on the Bill.

The *Wandsworth and Putney Gas Act* empowers the Wandsworth and Putney Gaslight and Coke Company to increase their present capital of £30,000 by the issue of additional shares to the amount of £40,000, the dividends on which are limited during five years to 7½ per cent., and afterwards to 7 per cent. The maximum price of gas is to be 4s. 6d. per 1000 feet, and its illuminating power 14 candles. The public lamps may be supplied by average meter indication, the meters to be paid for by the Local Board, and the proportion of meters to the lamps to be one in ten, "a proper regulating "apparatus" being fixed to every lamp. The price of the gas supplied to the public lamps is to be the lowest charged to any private consumer. The price to be paid for lighting, extinguishing, and cleaning the lamps, unless mutually agreed upon, is to be settled by two justices from time to time. A clause has been added for the protection of the sewers of the Metropolitan Board of Works. The Bill was greatly altered in committee; a clause for the extension of the company's district was omitted; the additional capital required was reduced from £70,000 to £40,000; the limitation of dividends to 7 per cent. after five years was added; also the clauses as to the price and quality of the gas, and the supply of the public lamps.

The second group, comprising Acts granted to companies who were previously carrying on their operations without statutory powers, amounts to 12.

The *Aldershot Gas and Water Act* gives power to the Aldershot Gas and Water Company to purchase the undertaking of the Aldershot Gas Consumers Company, Limited, for the sum of £4500, and to create 5 per cent. preference stock to that amount. The capital of the company is to be £25,000 in addition to the preference stock, with power to borrow £6200. The maximum price of 12-candle gas is to be 4s. 6d. per 1000 feet. The gas may be tested without previous notice. The maximum price named in the Bill was 5s. per 1000 feet, and 24 hours' notice was required before testing the illuminating power.

The *Banbury Gaslight Company, Limited*, have obtained an Act by which they are authorized to raise their present share capital of £10,000 to £30,000, the dividends on the new capital being limited to 7 per cent. on ordinary and 6 per cent. on preference shares. The company may purchase two acres of land, but they are not to erect works for storing gas within 300 yards of any dwelling-house, excepting on land contiguous to their works. Gas is to be supplied to the public lamps by average meter indication, if required, one meter being fixed to every twelfth lamp. The maximum price for 14-candle gas is to be 4s. 6d. within a radius of one mile from the town-hall, and 7s. beyond that distance; and the public lamps are to be supplied at the rate of 3s. 6d. per 1000 feet. The purity of the gas is to be ascertained by test-paper. In the original Bill the maximum price named for gas in the town was 5s. per 1000 feet, and six hours notice was required before testing the illuminating power of the gas, but by the Act no notice is required.

The *Briton Ferry Gas Act* incorporates the Briton Ferry Gas and Coke Consumers Company, Limited, with power to increase their capital of £5000 by the issue of additional shares to the amount of £3000, the dividend on which is limited to 7 per cent.; and they are authorized to hold 3 acres of land. The price of 14-candle gas is not to exceed 5s. 6d. per 1000 feet. A notice of 24 hours is to be given before testing the illuminating power.

The *Cleethorpes Gas Act* incorporates the Cleethorpes Gas Company, Limited, formed in 1863, with a capital of £5000, which is increased by the Act to £10,000, the dividends on the additional capital being limited to 7 per cent. The illuminating power of the gas is to be 14 candles, and the maximum price 5s. 10d. per 1000 feet. The power of purchasing land is limited to 3 acres.

The *Colchester Gas Act* incorporates the company established in that town in 1826, and hitherto without parliamentary powers. The capital of the company is £20,000, which they are authorized to double by the issue of shares to the amount of £20,000; the dividends on the new capital, if raised by preference shares, being limited to 6 per cent., and on ordinary shares 7 per cent. The power to purchase land by agreement is limited to 5 acres, and it is provided that no gas shall be made nor stored excepting on gas lands. The price of 14-candle gas is not to exceed 4s. 3d. per 1000 feet after March next, and its purity is to be ascertained by test-paper; six hours' notice being given before testing. The gas for the public lamps may, at the option of the lighting authority, be supplied by partial meter indication, in the proportion of one meter to 12 lamps, the meters to be provided at the cost of the company, and every lamp being provided with a proper self-acting pressure-guage. The price of gas for the public lamps is to be one-eighth less than is charged to other consumers, excepting the ordnance and barrack departments and the railway company. The lamps are to be lighted, extinguished, repaired, and cleaned by the company for 13s. per lamp per annum. The Act differs in many respects from the Bill. The quantity of land to be held has been reduced from 10 acres to 5, and the restriction as to storing gas has been introduced; the prescribed dividends on new capital have been reduced from 8 to 7 per cent.; the maximum price of gas has been lowered from 5s. per 1000 feet to 4s. 3d.; the notice

required before testing has been shortened from 24 hours to 6; and the conditions of supply to the public have been introduced.

The East Barnet Gas and Water Company Limited, formed in November, 1865, are incorporated by the *East Barnet Gas and Water Act*. The capital of the company consists of £50,000 in £10 shares, which they have power to divide into half-shares, of which one-half is to be called "preferred half "share," and the other "deferred half share." The dividends on the preferred half are limited to 6 per cent., and the dividends on the deferred half are not to be greater than would have been paid to the entire share had it not been divided. The illuminating power of the gas is to be 14 candles, and the maximum price, within two years from the passing of the Act, is to be 7s. per 1000 feet, and after that period 6s. The gas may be tested without notice. In the Bill promoted by the company the price of 7s. was named as constant, and the illuminating power was 12 candles instead of 14. The company are authorized to purchase the works of other gas or water companies within their district.

By the *Frome Gas Act*, the Frome Selwood Gas and Coke Company are incorporated, with power to increase their present capital of £12,000 by the addition of £13,000, on which the dividends are limited to 7 per cent. The price of gas is not to exceed 5s. per 1000 feet, and its illuminating power is to be equal to 14 candles, six hours' notice being given before testing. The purity of the gas is not specified. The illuminating power named in the Bill was 12 candles.

The *Grange and Cartmel District Gas and Water-Works Act* incorporates a new company with a capital of £20,000. The maximum price of 14-candle gas is to be 7s. per 1000 feet for the first five years, and 6s. afterwards; six hours' notice being given before testing. There is a clause in the Act authorizing the Furness Railway Company to subscribe £1000 towards the undertaking. In the Bill as introduced, the capital was divided into two parts, one-half of which was called "original "capital," and the other half "additional capital;" but the distinction is not recognized in the Act, which diminishes also the maximum price of gas, proposed to be 8s. per 1000 feet.

The Hornsey Gas Company, established in 1857, are incorporated by the *Hornsey Gas Act*, which gives power to raise the capital from £20,000 to £50,000, the dividend on the additional capital being limited to 7 per cent. on the ordinary shares, and to 6 per cent. on shares with preference. Any money accruing by way of premium for any share is to be considered as part of the capital. There are several clauses in the Act for the prevention of the contamination of water by the gas, it being provided that the pipes shall be laid at the greatest practicable distance from the water-mains, and power is given to the water company to dig about and examine the pipes and apparatus of the gas company to ascertain whether the water is contaminated thereby. The maximum price of 14-candle gas is to be 5s. per 1000 feet; a notice of 24 hours being requisite before testing the illuminating power; the purity of the gas not being specified. The maximum price named in the Bill was 6s. The land to be held by the company is not to exceed 5 acres.

The *Longton Gas Act* incorporates the Longton Gas Company, Limited, established in 1858, with power to double their present capital of £20,000. The dividends on the additional share capital are limited to 7 per cent. The company are empowered to hold 5 acres of land, but they are not to erect works for the storing of gas, excepting on the land now occupied by the company, at a less distance than 200 yards from any dwelling-house. The illuminating power of the gas is to be equal to 13 candles, and the maximum price, within a radius of one mile from the works, is to be 3s. 6d., and 4s. beyond that distance. The company are to light, extinguish, clean, and repair the public lamps for 12s. per lamp per annum, and to supply them with gas at the lowest price charged to any consumer. The gas is not to contain more than 20 grains of sulphur, nor more than 5 grains of ammonia in 100 feet, the quantity of sulphur to be ascertained by Dr. Letheby's test. No notice is required before testing. Power is given to the company to make an arrangement with the Stoke, Fenton, and Longton Gas Company for the purchase of the mains, meters, &c., of that company which are within the limits of the district supplied by the Longton Company, so that there may be no interference with the districts supplied by each company. This clause was inserted in committee. Several other alterations were made in the Bill, comprising the limitation of dividend on the new capital; the increase of the illuminating power of the gas from 12 candles to 13; the provisions respecting public lighting and the purity of the gas; and a proviso in the Bill, that when the price of coal exceeded 10s. 6d. per ton an extra 6d. per 1000 feet of gas might be charged by the company, was struck out.

The *Ryde Gas Act* empowers the Ryde Gas and Coke Company, established in 1847, to capitalize the sum of £3750 expended on the works out of profits, and to raise, by the creation of new shares, £31,250, making the total capital £50,000, to be divided into shares of £12 10s. each. The dividend on the capitalized profits is limited to 5 per cent., and on the additional shares to 7 per cent. The quantity of land to be held is limited to 6 acres, and the power of compulsory purchase is not to extend beyond three years. It is provided that no gas shall be stored within 200 yards of any dwelling-house, excepting on land now occupied by the company. The maximum price of 14-candle gas is to be 5s. per 1000 feet, and it may be tested without notice. The public lamps are not to be more than 60 yards apart, and the company are not bound to provide and lay down mains unless the yearly gas-rental will, for at least three years, be equal to 20 per cent. on the cost. The price charged for gas supplied to the public lamps is to be the lowest charged to any consumer. The variations between the Act and the original Bill consist in reducing the quantity of land to be held from 8 to 6 acres; in raising the standard of illuminating power from 12 to 14 candles; in reducing the maximum price from 5s. 6d. to 5s. per 1000 feet; and in specifying the distance from any dwelling at which gasholders may be erected.

The *Slough Gas Act* incorporates the Slough Gas and Coke Company, Limited, and gives them power to raise their present capital of £5000 to £20,000, the dividend on the ordinary additional shares being limited to 7 per cent., and if issued with preference to 6 per cent. The power to purchase land is limited to 5 acres, and no gas is to be stored excepting on the land now occupied by the company. The price of 14-candle gas is not to exceed 6s. per 1000 feet, and in testing the gas it is provided that no experiment shall be made in the absence of the manager of the works, until after the expiration of six hours from the time when the person appointed shall have entered the premises of the company. In the Bill a notice of 24 hours was required before testing the gas, and the quantity of land wanted was stated to be 10 acres.

The *Southgate and Colney Hatch Act* authorizes the company to raise additional capital and to purchase more land; but, the Act not having been printed, we are unable to state the particulars.

Two Acts were passed for giving statutory powers to undertakings hitherto conducted by private individuals.

The *Ventnor Gas and Water Act* incorporates a company for the purchase of the works carried on by Mr. A. F. Livesay. The capital of the company is to be £30,000. The illuminating power of the gas is to be 14 candles, and the maximum price 5s. 10d., it being alleged in the preamble that the high price of coals at Ventnor, the number of detached residences, and also the corrosive nature of the soil, are circumstances which render it reasonable that such a price should be charged. The promoters of the Bill had, indeed, named 6s. 8d. as a price reasonable under such circumstances for 12-candle gas. The public lamps, which are to be supplied at the lowest rate charged to any consumer, are not to be more than 100 yards apart within the town of Ventnor, nor 60 yards apart beyond the town; and it is provided, as in the Ryde Act, that the yearly rental on the mains shall be equal to at least 20 per cent. on their net cost. A notice of six hours is required before the person appointed to test the gas shall enter the company's premises, and the experiment is to be made in the presence of the manager of the works or other authorized officer. In the Bill the distance from the mains at which the company could be compelled to supply gas was limited to 10 yards, but it is extended in the Act to 20.

The *Walker and Wallsend Union Gas Act* authorizes the amalgamation into one undertaking of the gas-works hitherto carried on by Addison Potter, Esq., and known as the Willington Gas Company, and of the Walker and St. Anthony's Gaslight Company, Limited, registered in 1861. The capital of the

company is to be £25,000, and the dividends, beyond the capital allotted to the proprietors of shares in the two separate companies before amalgamation, are limited to 7 per cent. The maximum price of gas is to be 5s. per 1000 feet, and the illuminating power 14 candles, which is to be tested with a Sugg's steatite burner having an external diameter of 1·1-inch, an internal diameter of half-an-inch, each of the 15 holes to be 1-20th part of an inch in diameter, the chimney 7 inches high, and the rest for the gallery 1 inch below the top of the burner. The gas is not to contain more than 20 grains of sulphur in 100 feet, as ascertained by Dr. Letheby's test. A notice of six hours is to be given before testing. The company are authorized to lease or sell their undertaking to the Newcastle-upon-Tyne and Gateshead Gas Company. The standard of illuminating power named in the Bill was 12 candles; and the clauses respecting the purity of the gas and the modes of testing it were afterwards added. Several other minor alterations were made in the Bill.

Eight Bills were promoted by local authorities relating to the supply of gas, of which six were passed.

The *Aberavon Local Board Act* authorizes the Corporation of the borough to purchase the works of the Aberavon Gas and Coke Consumers Company, Limited, and to supply gas within the district. It is specified that if the Corporation shall, on or before the 1st of September next, give notice to the gas company of their intention to purchase the gas-works, the company shall be bound to sell on such terms as may be agreed or determined by arbitration. For the purpose of carrying on the works, the Corporation may purchase by agreement three acres of land, but they may not erect gasholders within 300 yards of any dwelling-house, excepting on land now occupied by the company, or adjoining thereto. The maximum price of gas is to be 5s. 6d. per 1000 feet, and its illuminating power equal to 14 candles. On a requisition signed by ten consumers, two justices may appoint a person to test the gas after having given 24 hours' notice, and if not found equal to the prescribed standard the Corporation are to forfeit a sum not exceeding £20. The purity of the gas is not specified. The Corporation are authorized to borrow for the purposes of the Act the sum of £5000 in addition to the amount they are authorized to borrow under the Public Health Acts. The revenue of the gas undertaking is to be applied, in the first instance, in payment of the costs of the Act; secondly, in payment of the interest on moneys borrowed; thirdly, in providing a sinking-fund for paying off the money borrowed for the purposes of the Act within 30 years from the 1st of January, 1868; fourthly, in payment of the expenses of managing and maintaining the gas-works; and fifthly, in improving and extending the gas-works and mains, and for the improvement of the town for the benefit of the inhabitants. The alterations made in the Bill consist in diminishing the price of gas from 6s. to 5s. 6d., and in reducing the number of consumers required to sign a requisition for testing the gas from twenty to ten.

The *Bury Gas Act* empowers the Improvement Commissioners to raise a further sum of money to enable them to complete the arrangements made with the Bury Gas Company in 1857, for the purchase of their undertaking, by the redemption of the remaining portion of the annuities then granted to the shareholders; and also to enable them to carry on the works. The commissioners are authorized to borrow on the security of the undertaking £50,000, and to create redeemable debenture stock to the amount of £112,250, bearing interest at the rate of 5 per cent. The money raised by the debenture stock is to be applied in paying off £8200 mortgage debt of the gas company, which was reborrowed by the commissioners; in paying off £13,250 borrowed for the redemption of annuities; in paying off £10,000 borrowed for the purposes of the gas-works; and in paying off the £50,000 authorized to be borrowed on the security of the gas undertaking.

The *Congleton Gas Act* authorizes the Corporation of that borough to purchase the works of the Congleton Gas Company, and to supply gas within the town and neighbourhood. The Corporation have entered into an agreement with the gas company for the purchase of their works, which agreement is set forth in a schedule, from which it appears that the consideration for the sale is to be £12,500, and the purchase is to be completed on the 22nd inst., but the works are at present leased to a contractor for the yearly rent of £850. The contract ceases on the 22nd of August, 1867, on or before which day the purchase-money is to be fully paid. The maximum price for 14-candle gas is to be 4s. 6d. per 1000 feet, 5s. having been named in the Bill. The gas may be tested on the requisition of five consumers at any reasonable hour without notice, and if it prove to be not of the required illuminating power the Corporation are to be liable to a penalty of £20. They are empowered to purchase, by agreement, 5 acres of land, but they are not to erect works for storing gas within 200 yards of any dwelling-house without the consent of the owner and occupier, excepting on land occupied by the company. Power is given to the Corporation to borrow £25,000 for the purposes of the gas-works, and a sinking-fund is to be formed from the profits of the undertaking, sufficient to pay off the money borrowed in 35 years.

The *Nelson Water and Gas Act* confirms an agreement entered into between the Local Board for the district of Nelson, Lancashire, and the Nelson Gas Company, for the purchase of the works of the company for the sum of £8887 10s. The purchase is to be completed within three months from the passing of the Act; the undertaking having been carried on from the 1st of April, 1865, on behalf of the Local Board, who are to pay the directors 5s. weekly for their loss of time in carrying on the business, and to the shareholders 7½ per cent. interest on the paid-up capital, amounting to £5925. It is provided that, so long as the owners of any gas-works now existing within the gas limits shall supply gas at prices not higher than the maximum price fixed by the Act, the Local Board shall not interfere with that supply without the consent of the owners of the gas-works. This proviso was added in committee. The maximum price for 14-candle gas is to be 5s. per 1000 feet within the district and 5s. 6d. beyond it; the prices named in the Bill having been 5s. 6d. and 6s. per 1000 feet. The gas may be tested on the requisition of five consumers, on giving six hours notice. A sinking-fund is to be provided for paying off the moneys borrowed for the purposes of the Act.

The object of the *Stockton Gas Act* is to empower the Corporation of Stockton, who purchased the gas-works from the Stockton Gas Company in 1857, to borrow a further sum of £25,000 on the credit of the gas-works and borough-fund, for the purpose of extending the supply of gas. It also provided that the illuminating power of the gas shall be raised from 10 candles to 14. Certain sections of the former Act are amended, to the effect principally that the Corporation shall set aside an annual sum as a sinking-fund, and that gas-rents be primarily liable for the sums borrowed. The clause for improving the quality of the gas was added in committee.

Of the nine Bills presented to Parliament for the incorporation of competing gas companies, only two passed through both Houses and received the Royal Assent.

The *Aldrington, Hove, and Brighton Gas Act* incorporates a company to compete with two existing companies at Brighton. The capital of the company is to be £75,000, divided into £10 shares, one-half of which are to be sold by public auction, in lots of not more than two shares each, any premiums arising from the sales to form part of the reserved fund. An annual specified statement of accounts is to be published, and a copy of the same is to be open to inspection on payment of a fee of 1s. The power to purchase lands is limited to 23 acres, but the company are not to store gas on any land, excepting that specified in a schedule to the Act, within the distance of 200 yards of any dwelling-house, without the consent of the owner and occupier. The annual charge for lighting, extinguishing, cleaning, and repairing the public lamps is not to exceed 13s. per lamp. The gas may be supplied to the public lamps by average meter indication, one meter to every 20th lamp being deemed sufficient, with the addition of "a proper self-acting "pressure-regulator" to each lamp; and the gas is to pass without obstruction. The maximum price of 14-candle gas is to be 3s. 6d. per 1000 feet, and the public lamps are to be supplied at the lowest rate charged to any private consumer. The gas is to be so far free from sulphur as not to contain more than 20 grains in 100 feet, nor more than 5 grains of ammonia. It is provided that if the council of the borough shall require gas to be supplied of the illuminating power of 15 candles, the company may charge 3s. 9d. per 1000 feet. A notice of three hours is to be given before testing; and it is provided that the company shall not be liable to any penalty if they can prove that defect in purity or illuminating power arose from any cause beyond their reasonable control. The streets in Brighton

are not to be opened for laying mains between the 31st of July and the 1st of February in any year, without the consent of the clerk of the local authority, except in cases of necessity. A map of the mains is to be made, which is to be open to inspection. The requirements as to the purity of the gas and additional illuminating power were added in committee, and the notice to be given before testing was shortened from six hours to three. There was no mention in the Bill of the restriction as to opening the streets nor of making a map of the mains.

The *Neath New Gas Act* incorporates a company, registered in 1865 as the Neath New Gas Company, Limited. The present capital of the company is £10,000, which they are authorized to increase by the issue of additional shares to the amount of £6000, with dividends limited to 7½ per cent. on ordinary shares, and to 6 per cent. if issued with preference. The power to purchase land is limited to three acres, and, excepting on the land specified, no gasholder is to be erected within a distance of 300 yards of any dwelling-house, without consent. The maximum price of 14-candle gas is to be 4s. 2d. per 1000 feet, 5s. having been named in the Bill. The gas may be tested at all reasonable hours without notice. A clause has been introduced into the Act to the effect that the company shall, if required by the existing gas company at Neath, purchase the works of the latter, the terms to be settled by agreement or arbitration. The restriction as to the storing of gas was also added in committee.

In the foregoing abstracts it has not been considered necessary to notice the usual clauses for the incorporation of general Acts, the general powers given to each company, the saving of previous rights and liabilities, the continuance of officers, the election of directors, &c., &c. The borrowing power granted to each company, when not otherwise specified, amounts to one-fourth of the additional capital.

The Bills rejected or withdrawn comprised 5 for giving further powers to existing companies with statutory powers—viz., the Bills promoted by the Equitable Company, the Chartered Company, the Chartered and City of London Companies jointly, the Imperial Company (No. 1) for removal of works to Hackney Wick, and the United General Company (Limerick). Of the 16 Bills promoted by companies requiring parliamentary sanction for carrying on their works, those of the Aldershot Gas Consumers Company, the Brynmawr Company, and the Childwall Company, were not passed. Of 9 Bills for the incorporation of competing companies, those of the Aldrington, Hove, and Brighton Company, and of the New Neath Company, were the only ones passed; and the latter was so far altered in committee as to compel the purchase of the works of the existing company. The 7 Bills rejected or withdrawn were those of the Chatham, &c., Consumers Company, the City of London Corporation, the Colchester Consumers Company, the Flintshire Oil Company, the London Railway Gas Company, the Slough and Datchet Company, and the Worksop Company. The Bill for amending the Metropolis Gas Act was withdrawn.

Circular to Gas Companies.

From the foregoing abstracts of the Gas Acts passed during the last session of Parliament, it will be perceived that the feeling of the Legislature with regard to gas companies has undergone little change since the previous session. With few exceptions the dividends on new capital have been limited to 7 per cent., and on preference shares to 6 per cent. The maximum prices of gas have been reduced, and the standard of illuminating power has been, in most instances, raised to 14 candles. In the regulations for the supply of public lamps, the Acts generally specify that the price shall be the lowest charged to any private consumer, and that the quantity supplied shall be determined by average meter indication, with self-acting regulators attached to every lamp. In the Colchester Act, however, which bears traces of Mr. Hughes's handiwork, it is provided that the gas supplied to the public lamps shall be charged one-eighth less than to private consumers. The notice required to be given before testing the gas was in most instances shortened by the committees, and in several cases it was dispensed with altogether. It is satisfactory to find that reckless competition met with little favour from Parliament; only two of nine competing Bills having been passed, and one of them was so altered in its character as to render the company non-competing. The influence of the explosion of gas at the works of the London Company is very perceptible in the gas legislation of the last session. It is evident the mistaken notion that the gasholders exploded is not removed, for it is provided in all cases, where additional land is required, that no gas shall be stored within 200 or 300 yards of any dwelling-house.

The annual accounts of the metropolitan gas companies for the year 1865, presented to Parliament in June last, show a continued increase in the gas-rentals, notwithstanding the general reductions in the price of gas. The total gas-rentals of the year amounted to £1,773,045, which is an increase of £71,492 on those of 1864; and during the last three years there has been a total increase of upwards of a quarter of a million sterling per annum in the receipts for gas by the metropolitan companies. It is very satisfactory to know that this increase has occurred in the face of reductions in the price within that period, amounting generally to sixpence per 1000 feet, and in one or two instances the price has been reduced as much as one shilling. The accounts of the Chartered Company exhibit the largest increase in the amount of gas-rental during the year—viz., £14,928. The increase of the Imperial amounted to £9167, of the City of London to £8819, of the Western Company to £7861, and the Phœnix to £7861. The only company whose accounts present a decrease in the gas-rental is the Independent, to the small extent of £802; but that is fully accounted for by the very liberal reduction in the price of gas from 4s. to 3s. 4d. per 1000 feet. There was an addition to the capitals and borrowed moneys of the companies to the extent of £460,000, of which the Imperial appropriated £200,000, the Phœnix £93,836, and the Commercial £55,759. The much larger consumption of gas that must necessarily have occurred to produce so large an increase in the rentals, notwithstanding the reductions in price, has of course added greatly to the expenditure, especially in coals, which—with the peculiar exception of the Equitable—presents a considerable increase. That company, indeed, with an increased gas-rental of £4087, appear to have expended £1830 less in coals than during the preceding year. The total increase in the expenditure in coals amounted to £52,483, or rather less than two-thirds of the increase in the gas-rentals. It will be seen from our abstract of the accounts that the average gross profit on the capitals of the 13 companies in 1865 was 9·92 per cent., and the average gross profit on the gas-rentals was 36·51 per cent., while the corresponding averages in 1864 were 11·32 and 49·31 respectively. The Equitable Company again heads the list, the accounts showing an increase on the gross profit on capital of from 12·64 to 14·26 per cent., and on the profit on the gas-rental from 49·49 to 55·67. The profits of the Chartered and the City of London Companies have increased about 1 per cent., while the gross profit on capital of the London Company has been reduced from 7·66 to 1·81, and the profit on the gas-rental from 33·29 to 8·19. This falling-off has no doubt been occasioned by the losses sustained by the disastrous explosion in November last, and by the expenditure incurred by the removal of the works from Nine Elms; the items of repair and maintenance of premises, &c., and of repair of mains, &c., showing an increase of £36,157 on the preceding year. The profit of the Independent Company on their capital has been reduced from 12·92 to 9·07 per cent., and on the gas-rental from 36·84 to 27·64 per cent. If those two companies be omitted—the diminution in the profits of which was caused by exceptional circumstances—the average gross profits on the capitals of the remaining 11 metropolitan companies would be fully equal to those of the previous year. The income from the sale of residual products in 1865 amounted to £393,128, against £360,580 in 1864, and £299,340 in 1863.

We regret to learn that the immunity from the attacks of cholera by the men employed in gas-works when that disease formerly afflicted this country, does not, according to recent experience at two of the east-end gas-works, appear to be maintained during the present return of the epidemic. The subject has been brought to notice by some letters in the *Times*, the first of which, from "A Gas Director," called attention to the fact that no death had occurred from cholera among workmen engaged in the metropolitan gas-works in former years, notwithstanding the men—from the peculiarity of their avocations, which expose them to great alternations of

heat and cold, and their not unfrequent habits of intemperance —may be considered especially accessible to such attacks. The comforting reliance of past experience on the safeguard of gas-works against cholera was dispelled on the following day by a letter from the Rev. F. S. Lea, of Trinity Parsonage, Bow Road, who asserted that in his neighbourhood no class of men had suffered so heavily as gasmen, and that on the first appearance of cholera in his district there were 14 or 15 deaths among them in a few days. He rebutted, at the same time, the charge of habits of intemperance brought against gasmen, which he said is contrary to his experience of them. Mr. Robert Jones, engineer of the Commercial Gas Company, in a letter of the same date, confirmed Mr. Lea's assertion, by stating that his company lost five of their men (stokers) in the first seven days of the present attack; and that the Great Central Gas Company, whose works are situated on Bow Common, lost double that number. It would be important to ascertain whether these are not exceptional cases, and due mainly to the abominations congregated on Bow Common and its neighbourhood. The fact is well established that the men employed in gas-works have previously been free from attacks of cholera when it was most destructive in the immediate neighbourhood, and nothing has yet appeared to indicate that there is any difference in the character of the disease. The epidemic has been confined as yet principally to the eastern and low-lying districts of the metropolis. It may be, that the gasmen who suffered exposed themselves recklessly to its attacks. The special poison that produces cholera may, no doubt, like other poisons, be resisted by proper safeguards; but no place of safety can be sufficiently protective unless precautions be taken to resist its inroads. In a letter we have received from Mr. Richards, who was manager of the gas-works at Barcelona in 1854, he attributes the remarkable escape from cholera of his men partly to their careful abstinence from food likely to be injurious, and from intoxicating drink. In that respect, indeed, they only followed the example of the whole population; but with them the precaution proved effectual, while those who were not under the influence of the exhalations of the gas-works died by thousands. The subject deserves a searching investigation, and inquiries should in the first place be instituted into the circumstances attending each of the fatal cases at the works of the Great Central and Commercial Companies.

Our attention has been drawn to a mis-statement in our last number relative to the proportion in which the profits of a gas company are legally divided among the proprietors of shares entitled to differential dividends. The holders of new shares subject to limitation of dividend to 7 per cent. are *not* liable to have that per centage reduced *pro ratâ*, if the profits are insufficient to pay the maximum dividend of 10 per cent., to which the old shares are entitled. It is specified by the general Acts that in case the profits are insufficient to pay the maximum dividend on all the shares, the shareholders are to be paid equally to the lowest prescribed rate, and the deficiency is to be borne by the shareholders who are entitled to the higher rate of dividend. The question whether this is the correct interpretation of the law was raised in 1856 in the case of *Beckett and Another v. the Sheffield United Gas Company*, when the holders of 8 per cent. shares filed a bill in Chancery against the directors of that company, who had, under the advice of counsel, made a proportionate abatement in the dividends on every class of shares. Vice-Chancellor Wood decided the case against the directors, and the holders of the 8 per cent. shares received the full amount of their prescribed dividend.

The Town Council of Dover have passed a resolution to indict the gas company for an alleged nuisance in the mode of carrying on their operations at their new works at Buckland. The works are leased to Messrs. Anderson and Jones, from whom a defiant letter was received in reply to a communication from the Board respecting the alleged nuisance, which style of answering the complaint exasperated some of the members of the Town Council. The complainant is a brewer, or rather, as Mr. Anderson asserts, the brewer's wife. The proceedings are, we presume, to be taken by the Council under the Nuisance Removal Acts, and to prevent a conviction it will be incumbent on the gas company to show that the best available means have been adopted to avoid injuring the public health. If they fail to do so, a fine may be inflicted. These proceedings differ from those by which an owner or occupier of property complaining of a nuisance exercises his common-law right of indicting the persons committing it, and several instances are on record in which gas companies, against whom verdicts with damages were obtained, have been ultimately compelled to remove their works. Unfortunately for the Dover Company, having leased their works to contractors, they have ceased to exercise any control over the operations; and it was remarked by one of the speakers at the meeting of the Town Council, that the defiant letter of the managers seemed to say: "We have got the gas-works, and mean to do "what we like with them." Unless there be some special arrangement whereby the contractors became liable for all penalties that may be inflicted, for nuisance or otherwise, the gas company may be placed in the unenviable position of being answerable for acts which they have no power to prevent.

An action brought against the Chartered Gas Company for damage from an explosion of gas in Oxford Street, alleged to have been caused by their negligence, has just been decided in favour of the company. The circumstances of the case were these:—The contractors for the Board of Works, in making a tunnel for sewerage purposes, sank a shaft opposite the premises of Mr. Medex, a tobacconist, and after the shaft had been filled up leakages of the gas and water pipes occurred, and an 8-inch main of the Chartered Company was fractured at one of the joints. The gas escaped into Mr. Medex's premises, and an explosion took place which occasioned damage estimated at £1000. The real plaintiffs were the Law Fire Insurance Company, but the action was brought in the name of the occupier. It came on for trial in the Court of Queen's Bench at the last Michaelmas sittings; but, in the absence of the requisite number of special jurymen, it was postponed, and was finally referred for arbitration. After a protracted inquiry, the arbitrator has made his award in favour of the company on all points, with costs, which amount to a considerable sum.

The trial of another action for damages under similar circumstances is reported in our present number. An explosion of gas occurred at Leeds, and the pipe from which the gas escaped had been broken by contractors employed by the Corporation in the construction of sewers. As no negligence could be proved against the company, the Judge before whom the case was heard held that the action could not be sustained, and a verdict was given in their favour.

Mr. Flintoff having failed to make the gas consumers of the metropolis appreciate his efforts to benefit them, intends once more to rouse the good folks of Scotland to a sense of the injuries they are sustaining from the gas companies. He advertises in a Dundee paper that, in September next, he will deliver a series of lectures on the gas question in Edinburgh, Glasgow, Perth, and Dundee, "to obtain still further reduc- "tions in the price of gas, and expose the doings of gas com- "panies." It appears from his advertisement that he has saved the gas consumers of Great Britain and Ireland the enormous sum of £800,000 a year, which is a considerable increase on the amount before stated, and yet the ungrateful public refuse to remunerate the services of their benefactor, and suffer him to advertise himself as a lecturer for hire. It is about five years since Mr. Flintoff favoured with his presence the towns he now purposes to revisit; but we are not aware that circumstances have so far changed in the interval as to give him more chance of success than he then experienced, and it was not of a kind to encourage him to repeat the experiment.

The two Brighton gas companies have issued notices of their intention to reduce the price of gas to 3s. 6d. per 1000 feet from the 25th of June last. The Brighton and Hove Company were compelled by their Act of last session to supply 14-candle gas at that price, and they determined to anticipate the period of their legal obligations. The old company deemed it politic to follow the example as to price, and though under no legal obligation as to quality they consider it requisite to raise their standard to an equality with that of the Brighton and Hove Company. Under such circumstances the Aldrington, Hove, and Brighton Company, who obtained their Act last session to compete with the existing companies, will, we conceive, scarcely venture to commence operations. Even without that competition the two established Brighton companies will find it difficult to supply gas with remunerative profit at such a price, and we shall be anxious to see the reports of the directors at the next meetings of shareholders after the conditions imposed on them have had a fair trial.

DETAILS OF INCOME, FOR THE YEAR 1865.

Name of Company.	Total Gas-Rental.	Common Gas, at 5s., 4s. 6d., 4s. 5d., 4s. 3d., 4s., 3s. 9d., 3s. 8d., & 3s. 4d. per 1000 Cubic Feet.	Cannel Gas, at 6s. & 5s. 6d per 1000 Cubic Feet.	Public Lights, including Lighting and Contracts.	Meter-Rents.	Old Materials.	Products.	Miscellaneous.	Total Income from all Sources.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Chartered	271,803 9 5	187,411 12 6	59,915 2 9	24,476 14 2	4,509 16 0	1628 19 5	51,898 6 8	4,547 7 9	334,387 19 3
City of London	112,367 0 1	102,014 2 1	6,020 9 4	4,332 8 8	None chgd.	788 2 3	25,768 4 0	166 3 6	139,089 9 10
Commercial	126,467 6 11	111,942 16 9	..	14,524 10 2	None chgd.	..	24,825 4 10	1,165 13 4	152,458 5 1
Equitable	76,861 8 1	62,971 18 7	7,476 6 8	6,413 2 10	1,551 7 1	143 4 2	15,073 4 10	303 17 3	93,933 1 5
Great Central	82,064 15 11	72,325 19 0	..	9,738 16 11	None chgd.	..	24,323 12 2	218 1 4	106,606 9 5
Imperial	470,830 16 4	404,793 12 4	..	66,037 4 0	7,569 11 0	1456 9 7	94,589 9 3	875 16 4	575,322 2 6
Independent	64,844 18 6	59,114 13 5	..	5,730 5 1	2,084 19 1	478 17 10	18,363 11 11	1,066 3 6	86,838 10 10
London	152,498 10 6	126,135 13 0	7,442 17 5	18,920 0 1	2,316 0 0	2748 6 1	41,083 7 11	17 2 6	198,663 7 0
Phœnix	165,864 2 5	145,510 12 3	..	20,353 10 2	None chgd.	..	48,632 17 3	1,356 13 11	215,853 13 7
Ratcliff	32,010 9 8	27,887 8 9	..	4,123 0 11	10 0 10	175 13 9	8,597 1 8	182 13 7	40,975 19 6
South Metropolitan	65,076 9 6	57,096 11 8	..	7,979 17 10	None chgd.	170 7 9	22,406 0 5	2,319 10 8	89,972 8 4
Surrey Consumers	60,558 5 2	47,670 7 7	..	12,887 17 7	None chgd.	..	12,994 5 3	69 7 9	73,621 18 2
Western	91,798 0 10	..	80,243 6 9	11,554 14 1	2,427 10 8	84 12 0	9,572 18 2	..	103,883 1 8
	1,773,045 13 4	1,404,875 7 11	161,098 2 11	207,072 2 6	20,469 4 8	7674 12 10	398,128 4 4	12,288 11 5	2,211,606 6 7

ABSTRACT OF DETAILS OF INCOME AND EXPENDITURE, SHOWING THE PROFIT REALIZED.

Name of Company.	Total Expenditure on Revenue Account.	Gross Profit.	Capital and Borrowed Moneys.	Gross Profit per Cent. on the Capital and Borrowed Moneys.	Gross Profit per Cent. on the Gas-Rental.
	£ s. d.	£ s. d.	£ s. d.		
Chartered	238,228 3 1	96,159 16 2	780,000 0 0	12·34	35·38
City of London	95,395 8 2	43,694 1 8	437,595 0 0	9·98	38·88
Commercial	99,492 17 0	53,009 9 2	437,616 0 0	12·11	41·91
Equitable	51,140 18 6	42,792 2 11	300,000 0 0	14·26	55·67
Great Central	72,011 9 5	34,595 0 0	266,000 0 0	13·00	42·15
Imperial	397,374 10 3	177,947 12 8	1,703,000 0 0	10·45	37·79
Independent	68,911 16 7	17,926 14 3	197,500 0 0	9·07	27·64
London	186,164 12 11	12,498 14 1	689,806 0 0	1·81	8·19
Phœnix	145,571 11 3	70,282 2 4	852,836 0 0	8·24	42·37
Ratcliff	29,139 7 4	11,836 12 2	105,448 6 8	11·22	36·97
South Metropolitan	69,671 6 11	20,301 1 5	200,000 0 0	10·15	31·19
Surrey Consumers	49,093 1 6	24,528 16 8	229,045 0 0	10·71	40·50
Western	62,047 16 11	41,835 4 9	322,485 0 0	12·97	45·57
	1,564,242 19 10	647,407 7 10	6,521,331 6 8	9·92 Average.	36·51 Average.

DETAILS OF EXPENDITURE ON REVENUE ACCOUNT, FOR THE YEAR 1865.

Name of Company.	Coals, including Carriage and Dues.	Purifying Materials.	Supervision and Labour in Manufacture of Gas.	Ordinary Repair and Maintenance of Premises, Tools, and other Implements.	Rents, Rates, and Taxes.	Salaries.	Collectors Commission.	Stationery, Printing, and General Charges.	Directors.	Auditors.	Expense of Distribution and Ordinary Repairs of Mains and Services.	Restoring and Replacing Meters.	Law and Parliamentary Charges.	Bad Debts and Extraordinary Expenses.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Chartered	134,135 15 1	3,313 3 9	30,926 12 2	25,183 12 6	10,173 14 9	8,268 13 11	3,745 15 10	4,025 3 3	2,326 16 0	152 5 0	7,724 17 6	5,303 13 10	1,586 1 3	1,361 18 3
City of London	46,942 19 7	702 12 6	18,545 0 0	10,042 12 0	2,887 3 3	1,623 6 8	900 0 0	1,141 18 5	1,180 15 6	109 4 0	7,679 16 8	2,511 1 9	92 8 8	1,036 9 2
Commercial	58,733 7 0	2,555 12 9	18,247 11 6	5,844 13 8	2,861 12 7	2,689 3 2	1,405 0 3	2,234 4 8	1,500 0 0	150 0 0	2,453 2 2	769 9 0	49 0 3	—
Equitable	28,607 14 7	412 16 0	7,048 7 0	4,442 19 8	1,578 5 4	1,765 6 8	991 10 7	700 12 1	1,300 0 0	90 0 0	3,453 14 6	642 18 7	106 13 6	—
Great Central	36,555 0 9	617 2 3	11,913 6 0	2,970 11 0	1,721 5 8	1,374 0 0	899 10 2	1,581 17 11	1,500 0 0	75 2 6	6,383 19 7	869 13 7	282 9 6	5,267 10 6
Imperial	216,937 13 3	4,295 3 3	49,114 4 5	52,894 1 11	10,448 13 10	8,861 19 6	7,570 6 9	4,937 18 10	2,500 0 0	157 10 0	29,392 19 0	4,163 1 11	3,001 3 11	3,099 13 8
Independent	36,366 5 5	514 12 5	13,622 13 5	7,399 15 8	1,662 9 9	1,348 15 0	1,242 8 8	1,237 19 0	1,700 0 0	100 0 0	1,535 0 8	1,488 7 1	125 6 6	568 3 0
London	68,262 8 3	174 17 6	21,410 1 0	56,827 3 10	6,416 18 1	3,602 0 0	2,130 5 7	4,692 5 4	1,468 15 0	97 18 3	17,257 8 7	3,485 14 8	338 16 10	—
Phœnix	74,018 12 8	2,132 15 0	19,424 11 6	13,388 6 6	4,358 6 1	2,567 7 5	2,361 18 7	2,127 14 9	2,000 0 0	100 0 0	14,011 16 3	3,130 8 6	5,179 2 4	770 11 8
Ratcliff	16,331 17 5	549 18 3	6,411 18 9	2,192 7 6	940 8 5	774 0 0	311 12 0	439 1 11	800 0 0	31 10 0	166 8 6	5 17 0	59 16 2	124 11 5
South Metropolitan	36,867 3 8	576 14 11	11,681 4 3	3,617 4 6	1,893 16 6	2,176 3 0	915 8 7	1,609 5 9	1,200 0 0	100 0 0	5,792 11 5	2,300 0 2	591 2 0	350 12 2
Surrey Consumers	26,112 1 1	928 8 0	9,435 10 8	2,528 4 7	1,822 7 0	942 14 0	756 18 0	759 1 1	1,500 0 0	63 0 0	1,502 10 3	267 14 6	193 5 4	2,281 7 0
Western	38,077 10 6	249 14 8	8,040 6 7	4,846 4 10	1,186 2 3	2,056 19 6	1,101 9 5	2,048 12 2	1,250 0 0	80 0 0	2,018 6 11	582 17 1	121 9 6	388 3 6
	817,948 9 3	17,023 11 3	225,821 7 3	192,177 18 2	47,951 3 6	38,050 8 10	24,332 4 5	27,535 15 2	20,226 6 6	1,306 9 9	99,372 12 0	25,520 17 8	11,726 15 9	15,249 0 4

METROPOLIS GAS COMPANIES, 1865.

REVENUE ACCOUNT, *compared with that of* 1864, *showing the Increase or Decrease in each Item.*

	Chartered.		City of London.		Commercial.		Equitable.		Great Central.		Imperial.		Independent.		London.		Phœnix.		Ratcliff.		South Metropolitan.		Surrey Consumers.		Western.	
	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.
	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£
Total gas-rental	14925	..	8819	..	5736	..	4087	..	4827	..	9494	..	..	802	1494	..	7296	..	1245	..	726	..	5784	..	7861	—
Common gas	9227	..	7951	..	5399	..	4134	..	2186	..	9621	..	..	681	1917	..	6908	..	1275	..	901	..	4959	..	..	—
Cannel ditto	5433	..	1025	..	..	..	76	..	..	..	..	..	..	..	..	532	..	..	..	..	..	..	..	..	7664	—
Public lights, including lighting and contracts	265	..	..	157	337	..	..	122	2640	..	..	127	..	120	110	..	387	..	..	30	..	175	824	..	196	—
Meter-rents	..	39	None	chgd.	None	chgd.	2	..	None	chgd.	77	..	88	..	106	..	None	chgd.	..	..	None	chgd.	None	chgd.	170	—
Old materials	..	33	..	136	..	..	8	..	..	..	696	..	243	..	1233	..	..	..	..	16	..	27	..	368	..	10
Products	3010	..	4497	..	1147	..	783	..	928	..	6381	..	1523	..	5495	..	6771	..	859	..	3740	..	..	734	3148	—
Miscellaneous	334	..	159	..	..	105	..	91	97	..	..	1210	110	..	7	..	485	..	80	..	..	22	3037	..	..	—
Total income from all sources	18197	..	13338	..	6778	..	4789	..	5952	..	15437	..	1164	..	8334	..	14551	..	2166	..	4417	..	1642	..	11169	—
Ditto expenditure on revenue account	14278	..	8295	..	1941	..	..	1987	1801	..	34211	..	7425	..	46115	..	16815	..	1172	..	8287	..	557	..	7779	—
Gross profit	3920	..	5044	..	4880	..	6776	..	4152	..	..	18774	..	6261	..	37781	..	2264	994	..	..	3869	1086	..	3390	—
Capital and borrowed moneys	..	..	2150	..	55759	..	15200	..	14600	..	201185	..	10300	..	33789	..	93836	..	1000	..	..	..	12771	..	19435	—
Gross profit per cent. on capital, &c.	·52	..	1·11	..	·49	..	1·62	..	·90	..	..	2·64	..	3·85	..	5·85	..	1·31	·84	..	..	1·93	..	·12	·29	—
Ditto ditto on the gas-rental	·52	..	1·56	..	2·05	..	6·18	..	2·74	..	..	4·85	..	9·20	..	25·10	..	3·38	1·73	..	..	6·37	..	2·29	..	·23

METROPOLIS GAS COMPANIES, 1865.

EXPENDITURE *compared with that of* 1864, *showing the Increase or Decrease in each Item.*

	Chartered.		City of London.		Commercial.		Equitable.		Great Central.		Imperial.		Independent.		London.		Phœnix.		Ratcliff.		South Metropolitan.		Surrey Consumers.		Western.	
	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.
	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£
Coals, including carriage and dues	8946	..	3146	..	3246	..	..	1830	2889	..	16584	..	1943	..	4563	..	7362	..	1476	..	4852	..	248	..	3058	—
Purifying materials	114	..	54	..	..	223	..	574	23	..	338	..	..	175	..	1062	483	..	111	..	..	70	253	..	..	24
Supervision, labour, &c.	1277	..	2974	..	1090	..	664	..	825	..	3498	..	1157	..	2581	..	1757	..	648	..	1911	..	..	548	1064	—
Repair and maintenance of premises, tools, &c.	1427	..	3271	..	484	..	..	520	834	..	..	188	5024	..	27005	..	1225	..	1199	..	..	534	..	817	2359	—
Rents, rates, and taxes	1620	..	877	..	..	446	193	..	82	..	2967	..	358	..	1776	..	..	11	..	134	102	..	83	..	154	—
Salaries	1018	..	150	..	492	..	11	..	..	..	898	..	18	..	136	..	287	..	..	11	299	..	..	16	141	—
Collectors commission	30	..	158	..	56	..	68	..	32	..	399	..	313	..	..	6	203	..	12	..	65	..	110	..	128	—
Stationery, printing, and general charges	437	..	172	..	65	..	39	..	..	77	1163	..	154	..	2568	..	..	387	..	43	440	..	..	43	1269	—
Directors	60	..	..	244	..	..	..	..	..	..	..	..	500	..	..	24	..	..	..	..	200	..	..	..	..	—
Auditors	21	..	..	..	..	..	..	..	8	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	—
Distribution and repair of mains and services	1572	..	..	165	..	2416	108	..	22	..	6020	..	..	530	9152	..	1193	..	..	1964	1148	..	..	349	3	—
Restoring and replacing meters	..	545	..	8	11	..	..	121	..	172	1348	..	..	344	181	..	363	..	..	..	..	591	..	189	..	74
Law and parliamentary charges	1035	..	..	1064	..	416	..	25	..	480	1167	..	..	657	..	753	4477	..	..	90	418	..	..	61	..	192
Bad debts and extraordinary expenses	..	2888	..	1026	..	..	..	..	..	518	17	..	..	337	..	..	..	138	..	32	48	..	1885	..	..	105

Correspondence.

GAS-WORKS AND CHOLERA.

SIR,—Mr. Richards' letter to you of the 3rd inst., on "Immunity of Gas-Works from Cholera," is one important evidence towards proving gas-works, in a sanitary point, are beneficial to health, and my reasons for believing such to be the case are the following facts:—

1. That it is well known people who live close to gas-works enjoy good health, and are freer from attacks of cholera.

2. That workmen employed in the manufacture of gas are rarely ever attacked by cholera or other diseases.

3. That the elements of coal, when distilled, are all antiseptic, and neutralize putrescent matters and gases prejudicial to health, which arise from the liberation of the elements of animal and vegetable matters in a state of decomposition.

4. That gas tar gives off constantly abundance of ozone, which I consider to be the oxygen of the air changed from its neutral state of oxygen as found in our atmosphere to that of oxygen with positive electricity, whilst antozone is oxygen with negative electricity. If the absence of ozone in the air, during periods of cholera, is a sign of an unhealthy atmosphere and an excess of organic impurities in it, then we may conclude gas tar, as giving off ozone, conduces to the maintenance of a healthy atmosphere. Independent of gas tar giving off ozone, it is also beneficial from giving off those hydrocarbons which keep up a positive state of electricity; and where gas tar has been put in saucers in rooms of those who have died from disease or other causes, all the unhealthy gases given off from those bodies become at once neutralized, and only the gases from the tar is smelt in the rooms, and the too rapid liberation of the elements of those bodies is checked. Before putting the body of a person who has died of cholera into the coffin, it will be found that a layer of sawdust put into the bottom of the coffin with gas tar on it, and then covered with another layer of sawdust, will also prevent offensive smells and deleterious gases arising into the air. Gas tar will drive off those scavengers of nature which collect where there are manure heaps to feed on the putrescent matters in them; also it will cause fleas and bugs to disappear from rooms, when put in open saucers and the rooms shut up for two days and nights. Stoves, in dwelling-houses of the poor, if painted with gas tar will, when heated, give off gases which get rid of fleas and bugs. Gas tar, as a manure, is beneficial with other manures for melons, cucumbers, vines, and cereal crops, and, when judiciously used, will get rid of the red spider. During the war in the Crimea, I suggested to Government gas tar to paint the wooden huts to keep off fleas, &c., and to keep up a healthy atmosphere, and thus act as a preventive to cholera.

5. That gas water is antiseptic, the ammoniacal matters in it having undergone chemical action and purification in the earth and by fire, and are not of the putrescent character of the ammoniacal gases given off from manure heaps. Gas water, filtered through blotting-paper and mixed with two or three parts water, will cure ringworm, and rags wetted with it and put on sores tend to heal them. Gas water is, when diluted, most beneficial to grass lands; and in its undiluted state on arable lands it has caused the growth of splendid cereal crops, and stopped the ravages of the wireworm and other worms.

6. That gas lime, in hundreds of cases, has cured hooping-cough where children have been sent to gas-works to inhale the gases given off by gas lime.

7. That coal gas allowed to escape from one or more burners at night into the large rooms of the Hull, Kingston, Flax and Cotton Mills during cholera, caused decreased sickness and the restoration of the health of the workpeople.

8. That the process of gas-making is beneficial to the inhabitants of any locality, and neutralizes all those organic impurities which favour attacks of cholera, for the hydrocarbons and ozone given off, &c., all tend to keep up a positive state of electricity necessary to vitality, and prevent a negative state of electricity arising from organic impurities, robbing the atmosphere of its oxygen and positive electricity.

During thunderstorms, when there is a negative state of electricity, people are attacked by cholera, and the potato disease manifests itself, and unfermented ale in casks is acted on by electricity. People who drink water containing organic impurities, or who eat unripe fruit, are more liable to attacks of cholera; and I look upon the contents of the stomach, in the above cases, to be acted upon similarly to the unfermented ale by the negative state of electricity during thunderstorms. In certain cycles of time there may arise atmospheric and telluric disturbances which give rise to the want of positive electricity and its neutralization of atmospheric impurities by its antiseptic influence. I look upon positive electricity as tending to consolidate and to drive off moisture; whilst, on the other hand, negative electricity favours moisture and the liberation of the elements of animal and vegetable matters. During periods of cholera fungi have been found floating in the air, and as no fungi exist where there is positive electricity, but only where there is negative electricity, I may conclude that there is a negative state of electricity during cholera periods. Those slate-coloured mists, which have been noticed to hang like a blanket over places where cholera has been prevalent, indicate a negative state of electricity, and the want of positive electricity to drive off their moisture. Peltier, by his experiments, found slate-coloured clouds indicated negative electricity, and red orange-coloured clouds positive electricity. The strong fungus smell of a cholera atmosphere is also a sign of negative electricity. No electricity is given off by the glass cylinder electrifying machine in a moist atmosphere and during cholera, until there is a return of the positive state of electricity, when cholera disappears; but negative electricity is given off from a cylinder of sulphur in a moist atmosphere. In the above cases the positive and negative state of electricity must exert powerful influences according to their balanced or unbalanced states, and be favourable or unfavourable to disease in the animal and vegetable kingdoms. In former letters addressed to you, you will find many facts alluded to in this letter. I hope the facts here given will lead to further investigation to prove that the elements of coal act beneficially in a sanitary point of view, and are, from their antiseptic properties, favourable to a healthy atmosphere, and instead of being injurious to health, on the contrary, are conducive to health, and act as a preventive to cholera. JOHN MALAM.

Holmpton Hall, August 10, 1866.

PS.—As pure water is most essential to health, I would suggest to all water companies that they supply *electrified* water to the public, for they could, after filtration, electrify their water on the principle proposed by Cross, the late electrician, for purifying water, wines, and brandy, viz.:—"Two cylinders of dissimilar metals (generally sheet-zinc and sheet-iron) are placed in two porous earthenware tubes open at the top and closed at the bottom. The metallic cylinders being connected together by a copper riband, the porous tubes with the metals inverted in them are filled with water and placed in the fluid required to be purified. The electrical action immediately commences, and the fluid not only becomes purified but is *rendered antiseptic* in a few hours." The acids pass into the positive tube and the nitrogenous matters into the negative tube, and the tubes could be taken out of the reservoirs to free them from the acids and nitrogenous matters. The size and number of the tubes and cylinders would depend upon the quantity of water to be purified. Cross states, also: "The antiseptic power of electrified water is very remarkable; not only can it be preserved for years perfectly clear and fresh, but it has the power of restoring the most putrid substances to sweetness. Pieces of meat, and the skins of animals in a state of putridity, have been immersed in electrified water and in a few hours rendered inodorous. Milk has also been kept sweet for three weeks in the middle of summer by the application of electricity." Electrified water of water companies would be rendered beneficial by the above plan in case of disease, and its powerful antiseptic vitalizing properties would give tone to the electro-nervous system, when there is a deficiency of the electro-nervous fluid during periods of cholera.

SULPHUR TEST APPARATUS.

SIR,—Professor Anderson deserves our best thanks for his valuable investigations on sulphur analysis. It appears to me that the principal source of error has not yet been pointed out by him. While we agree in the superiority of the single jet burner over the "Leslie," it is my impression that the difference does not consist in a better combustion of the one over the other, but rather to the diameter and to the heat of the ascending column of the products of combustion.

About six months ago my attention was drawn to the various causes of inaccuracy of Dr. Letheby's apparatus, and since that time I have made a series of experiments with a view to remedy the defects. In the apparatus, as it is now constructed, there is no way for the carbonic acid gas to escape from the condenser, except down the trumpet tube, and thereby carrying with it more or less of the sulphurous compound. If the condenser prove efficient in condensing *all* the watery vapour of the burnt gas (and this will depend on the temperature of the room) the carbonic acid will certainly be too cold and heavy to escape through the chimney tube, except a very small quantity through the power of diffusion. A large quantity of ammonia, however, will help to fix the carbonic acid in the condenser, and also assist some of it to escape in the gaseous state, inasmuch as two volumes of ammonia unite with one of carbonic acid to form carbonate of ammonia, making its specific gravity to atmospheric air as 13 is to 14·47; but this is an expensive and a very uncertain method.

Cheltenham, August 15, 1866. W. E. WILLIAMS.

TOWNELEY MAIN COAL.

SIR,—In your JOURNAL of the 7th inst. it is stated that "the high reputation for purity which the Towneley coal has acquired," owing to its being "most free from sulphur," has caused such a large demand for it "that it could not be obtained in sufficient quantity." This, until recently, has been to a great extent true; but I have great pleasure in stating that, having completed the successful opening of a new pit, we are now in a position to produce an increased quantity if necessary. ADDISON POTTER.

Newcastle-on-Tyne, August 11, 1866.

THE GEOLOGY OF THE LONDON BASIN.

SIR,—In your number of the 10th of July, you made some statements with regard to the geology of London, that I think would be of a nature to throw off the scent those who might be disposed to examine into the geology of the London basin with the view to the discovery of coal therein. As I am one of those who believe that careful experiments would be rewarded in the search for coal in this locality, perhaps you will allow me to call attention to what I conceive to be the defects of the theory upon which you have based your reasoning.

You have argued as though the sequence of the strata were always preserved, and that if there were found on the surface one formation the others would occur in regular order underneath. But it is not so; and geology is now known to indicate very well what we shall *not* find, but it is not able to indicate what we *shall* find. Thus, in the London basin itself, after the boring of the Hampstead Water-Work had been carried through the chalk and the subcretaceous strata, including the gault, but not the lower green sand, to the depth of about 1200 feet, the operations were carried on in a series of beds that all geologists consider were members of the lower red sandstone series. This opinion was, singularly enough, confirmed by the results that were obtained in the boring of the Harwich well, that resulted in finding, immediately after the gault, the slate rocks, precisely as they had occurred in the wells at Calais and at Ostend; thus giving great reason for the supposition, that the outcrop of the carboniferous strata would be found somewhere between Harwich and London. But the importance of the results thus attained, was more connected with the conditions of the underground strata, than that immediately connected with the occurrence of the coal measures. It proved that if the sequence of the strata were, on the surface, perfect, there was no certainty that this would be preserved underground. Under London, in fact, the whole series of the lower green sand, the wealdean, the oolites, and the lias, are wanting, and the red sandstone occurs immediately underneath the gault clay, without any interposition such as theory would lead us to expect.

The importance of these considerations, however, for the search of the coal-field in the neighbourhood of London, is to be found in the conditions of the Weald of Kent. It is known that in Belgium there are many pits worked for the extraction of that mineral underneath a prolongation of the formation that comes to the surface in Kent; in fact, the Belgian coal-field is in great part under the wealden conformations. Now it seems to me likely that, if search were made under the English formation of the weald, some such result as has attended the Belgian operations might be met with, more especially as the Belgian coal-field has been traced as far as Marquise, in the Pas de Calais, under the chalk. It is very curious, at any rate, that if a line be drawn in a straight direction from Marquise to the Bristol and the South Wales coal-fields, it will be found to pass in the direction of the axis of the weald, and the "*divortia aquarum*" of the rivers that fall respectively into the Thames on one side and into the British Channel on the other. The occurrence of this line of geological disturbance seems, at first sight, to be connected with some line of disturbance beneath the surface; and that, as in Belgium, there is a great probability of the coal measure existing under the axis of the weald. Of course I do not recommend any one to incur the certain expense of boring, for the purpose of ascertaining the fact; as the law is so unjust, that any one who might discover the coal by this means would have no advantage over his neighbour, who might simply take the benefit of the outlay that the first man might incur. But I think that there is every probability that, at a less distance from the surface than is thought in Belgium to be worth working, coal might be found under the weald. There are in Belgium mines worked at the depth of 3000 feet, and at La Rochelle the boring for water has been carried to the depth of 2750 feet; these depths would, I am convinced, be sufficient to solve the question of the occurrence of the coal under the weald, and I myself shall always believe that, until it shall have been tried, the coal measures exist in this locality.

Perhaps, now that there seems a probability of an attempt being made to carry out the scheme for uniting England and France by means of a tunnel, it may be worth while to try a boring for coal in the immediate neighbourhood. This is thrown out as a hint for the engineers of this monstrous undertaking; it would in no ways affect the certain *non-success* of that most quixotic scheme.

I forgot, whilst discussing the sequence of strata, two remarkable instances of the apparent irregularity of the occurrence of the geological order of the beds. The first is in the neighbourhood of Auxerre, in the Department of the Yonne, where the granite is in immediate contact with the lias, and is there found without the intervention of the upper red sand, the carboniferous series, the lower red sand, the millstone grits, the mountain limestones, &c. The second is in the district of Mount Sorel, in Leicestershire, where precisely the same conditions occur; the granite is in immediate contact with the lias, in a more decided manner, if possible, than that of the French example. Any one may have the opportunity of studying the circumstances of this apparent anomaly in the conditions of the earth's crust on the occasion of the visit of the British Association to the Charnwood Forest, in the course of the next month; at any rate, the geologist will, in the Leicester coal-field, discover sufficient indications of the existence of coal in that district to convince him that the fears of Great Britain's trenching upon her supplies of that mineral are chimerical, let the demand be what it may. The Ashby-de-la-Zouch coal-field would alone furnish the total quantity now consumed every year for an indefinite time to come; and this is without taking into account the Derbyshire, the Yorkshire, the Lancashire, the North and South Wales, the Cumberland, the Northumberland, the Durham, the Cheshire, the Scotch, and the Bristol coal-fields. The cry that our commercial prosperity is in danger, in fact, appears to me to have been raised by a set of men who thrive by exciting the fears of the Government of this country, that is profoundly ignorant of what it ought to know. The composition of the committee appointed to inquire into the subject of our coal supply is, it seems, very objectionable; it contains far too many names that are known to be employed on the geological survey of England, and that have already compromised themselves by their published opinions on the subject committed to them.

GEO. R. BURNELL, F.G.S.

5, Sussex Terrace, Hyde Park, August 17, 1866.

Register of New Patents.

2986.—GEORGE PUTLAND HEMMING, of 2, Winchester Street, Maldon Road, Kentish Town, Middlesex, and HENRY COYLE, of 46, Great Marylebone Street, London, for "*An improved trap or liquid sealing to the covers of cisterns, pans, jars, tubs, and other vessels or chambers.*" Provisional protection only obtained. Dated Nov. 20, 1865.

This invention consists in forming a groove or channel round the upper edge of the vessel to be trapped so that it may be tilted to empty it of its contents, and yet such groove or channel will still retain a sufficient quantity of liquid for subsequent sealing without the necessity of applying fresh liquid thereto. For this purpose one or both of the edges of the sides of the groove or channel are turned over and dip into the groove itself leaving space between them for the passage of the edge or rim of the lid or cover.

2990.—SAMUEL BENNETT, of the city of Manchester, in the co. of Lancaster, brassfounder and copper-smith, for "*Improvements in cocks for steam, water, air, and gases at high pressures, and also in gauge-cocks and water-gauges for boilers, and sediment-tubes for cocks and pipes.*" Patent dated Nov. 21, 1865.

This invention relates, first, to certain improvements in high-pressure cocks for steam, water, air, and gas, and consists in making two or more separate and distinct passages through the plug of each cock, and placing between the passages a rib or body of metal for connecting the sides of the plug together, and of an adjusting screw to keep the plug down upon its bearing in the barrel, and of a lock-nut to prevent the screw from moving when adjusted, and of a safety-cap to prevent any outward escape from the top of the cock, and also of a combination chamber or safety-cap with adjusting-screw and lock-nut.

Second, to improved gauge-cocks, and consists in the system of making two or more separate vessels through the plug of each cock, and an equal number of passages through the stem or branch, and also with the tubes of different lengths inside the boiler for indicating different levels at the same time.

Third, of various improvements in water-gauges, and consists in the employment of a metal frame with longitudinal slots at opposite sides, having internal stuffing-boxes at the two ends, and a chamber on the body of the cock in which the bottom end of the frame is placed, and a chamber or cap on the top of the frame to connect the steam-supply; also in the employment of a float for floating on the water in the glass tube, and of a bar or bars on the outside of the frame for indicating, either separately or conjointly, the level of the fluid in the boiler or the working level of the water.

Fourth, to the construction and employment of sediment-tubes or sockets, and their combination with the cocks of water-gauges and all descriptions of cocks and pipes for boilers and other vessels.

2998.—WILLIAM WELLS, of Manchester, gentleman, and SAMUEL MARLAND, of Clayton, near Manchester, oil-refiner, for "*Improvements in apparatus for obtaining artificial light from volatile liquids or fluids.*" Provisional protection only obtained. Dated Nov. 22, 1865.

This invention consists in causing atmospheric air to pass over distilled petroleum or other suitable volatile liquids contained in a vessel to which heat is applied to evaporate the volatile liquid. The atmospheric air in combination with the vapour of the volatile liquid is inflammable, and can be conveyed in air-tight pipes to the burners.

3036.—JOHN PHILLIPS BARAGWANATH, of 153, Upper Thames Street, London, engineer, for "*A combined adjustable spanner, tube-cutter, and pipe-wrench.*" A communication. Provisional protection only obtained. Dated Nov. 27, 1865.

The object of this invention is the construction of an implement in which are combined the properties of three distinct implements, viz., an adjustable or shifting spanner for screwing and unscrewing nuts and bolts, a cutter to divide tubes into sections, and a wrench or tongs to screw and unscrew pipes, couplings, and other similar connexions, a slight alteration only of parts being required to adapt the said implement to either of these purposes.

3061.—GEORGE MARSHALL, of Pont Blyddyn, near Mold, Flintshire, cooper, for "*Improved apparatus for facilitating the treating or preparing of casks and other vessels to make them tight and suitable for containing hydrocarbon and other fluids.*" Provisional protection only obtained. Dated Nov. 29, 1865.

This invention relates to apparatus for carrying into effect the system of

preparing casks, for which letters patent were obtained by the present patentee, dated Oct. 13, 1865, No. 2644. On a base plate or floor a framework of timber is erected, between the principals of which framework a moveable platform is placed. This platform can be raised and lowered by a lever, the fulcrum for which is in the frame, or by a rack and pinion, or by other means. Through or at the inner side of one of the principals, and over the moveable platform, a nozzle (by preference tapering for conveying the elastic fluid at pressure) is fixed, and through or at the opposite inner side of the framework, and also over the moveable platform, there is carried a lateral travelling centre for securing the cask to be treated or prepared when it is raised by the moveable platform. After the liquid glue or other coating used for filling the pores and joinings of the cask has been poured thereinto, the cask is placed on the platform and raised therewith. As the moveable platform (which is provided with a roughened surface to prevent the cask thereon from sliding) is being raised, it comes into contact with one or more angular guide pieces, and is thereby made to take a lateral as well as an upward direction, and in this way the cask, by its bunghole, is made to pass over or on to the nozzle above mentioned. When the cask is fairly on or exactly opposite to the nozzle, the travelling centre is pushed out by screw rack or other device, and made to secure it, and at this time the platform is allowed to fall down to the base plate or floor. The cask being now elevated sufficiently to allow it to be moved on an axial line between the nozzle and the travelling centre, it is evident that, by turning on the pressure of elastic fluid, and causing the cask to rotate, the treatment or preparation can be speedily accomplished.

3088.—Longdon M'Murdo Rogers, of Bouverie Street, London, merchant, for "*Improved means of preventing water-pipes from bursting.*" A communication. Provisional protection only obtained. Dated Dec. 1, 1865.

This invention consists in placing an elastic or flexible, compressible, and water-tight hollow ball within a suitable chamber provided in the pipe near and in communication with the faucet whence the water is drawn off. It also consists of placing directly within the service-pipe an elastic or flexible, compressible, and waterproof closed tube which extends through the whole length of that portion of the service-pipe which is exposed to the action of frost. It further consists of the employment in connexion with the aforesaid tube of an air-chamber, which may be varied in capacity as desired according to the hydrostatic pressure of the water in the pipes. Both the tube and ball may be made of india-rubber or gutta-percha strong enough to resist the pressure due to the head of water, and they should contain nothing but air. In case of any increase of pressure of the water in the pipe produced by sudden closing of the faucet, either the ball or the tube will be compressed and the pipe will thus be relieved from the effect of such increase of pressure and prevented from bursting.

3089.—William Johnston, of the city of Glasgow, in the co. of Lanark, N.B., lamp manufacturer, for "*Improvements in lamps, lanterns, and gas-fittings.*" Patent dated Dec. 2, 1865.

This invention has for its object improved ornamental effect, economy in manufacture, and facility for removal of parts for repairing and cleaning. One modification of the invention relates to lamps or lanterns of a well-known cylindrical form. The glass cylinder is placed between two metal bands or rings, which are furnished with small thin pieces of metal projected inwards, and between these projections the cylinder is held top and bottom. The bottom glass pane fits inside of the lower frame under the inner projections, and has a central aperture. A dome-shaped or other convex piece of glass, with an aperture at its upper side, and of a similar diameter at the base to that of the cylinder, is placed upon the upper side of the projection, inside of the upper frame. A central rod passing down the lantern is furnished at its lower end with a ring or projecting part or parts, which fit the under-side of the central aperture in the bottom glass pane. The central rod has similar projecting parts or rings fitting on the upper side of the opening at the top of the glass dome. By means of screws or other suitable appliances the entire parts constituting the lamp or lantern are firmly and securely held together. While the lantern is suspended it will thus be carried upon the bottom frame, which must be sufficiently strong, while the upper and lower frames may be quite thin, their purpose being chiefly ornamental, and to keep the cylinder in place.

3099.—Thomas Bell, of Plaistow, in the co. of Essex, for "*Improvements in treating the oxide of iron residues of gas purifying, in order principally to extract sulphur therefrom.*" Patent dated Dec. 2, 1865.

This invention has for its object improvements in treating the oxide of iron residues of gas purifying, in order principally to extract sulphur therefrom. According to this invention gas residue is treated with hydrochloric or other equivalent acid, which dissolves out the iron, leaving the sulphur contaminated only with matters which are in no way injurious in most manufacturing processes.

The following is the manner in which it is preferred to proceed:—The gas residue is washed with weak hydrochloric acid, such as at many chemical works is a waste product. This washing may be effected by agitating the residue with the acid, allowing it to subside, and decanting the clear liquor, or the acid may be caused to filter through the residue. Both of these systems of washing are well understood by manufacturing chemists. A small quantity only of acid is employed for the first washing. This liquor, which will contain nearly all the ammonia which was in the residue, is kept separate from the other washings, and is used for the first washings of different portions of waste until it becomes charged with iron and ammonia. Lime is then added, and the ammonia is distilled over and absorbed by sulphuric or other acid; or if caustic ammonia is required, it is condensed in water, as is well understood. The washing with acid is continued until it is found that the iron which the residue originally contained has all, or practically all, been dissolved out. The same acid may be repeatedly used, until it becomes so charged with iron as to be of no further use. In this manner residue containing at the outset 40 per cent. of sulphur is brought up to about 80 per cent. The purified residue is then thoroughly washed with water until only the least traces of acid remain. This may be neutralized by a final washing with lime water, or the addition of a small quantity of lime. The material is then dried, and it may be, if desired, melted and cast into rolls in the usual way. Although still containing some impurities which spoil its colour, it is then sufficiently pure for use for most manufacturing purposes for which brimstone is now employed. However, if a purer sulphur is required, the material, after it has been dried and before it is melted, may be washed with naphtha or other solvent, which will dissolve out naphthaline and some other impurities deposited by the gas, and which in some cases are found in sufficient quantity to be worth separating in this manner, irrespective of a purer sulphur being thereby obtained.

In place of using, as above described, weak hydrochloric acid such as is often a waste product, stronger acid may be used; indeed an economy of acid and of lime, although not usually of cost, is obtained by the use of stronger acid. In place of hydrochloric acid sulphuric acid may be substituted. Its action is in this process similar and equivalent to that of hydrochloric acid, but it is more convenient to use the latter.

3101.—Thomas Newton Bennie, of Gowan, Lanark, engineer, for "*Improvements in apparatus for distilling oils and condensing oily vapours.*" Provisional protection only obtained. Dated Dec. 2, 1865.

The first part of this invention relates to the construction of apparatus or retorts for distilling oil from shale or other substances. The apparatus consists of a pan provided with a cover, through a gland in which the shaft of an agitator passes. The agitator is caused to rotate by any suitable gearing, and is composed of claws or forks touching the bottom of the pan, or nearly so, and which, as the agitator revolves, act upon and turn over the shale or other substance contained in the pan, whereby fresh portions of the shale are submitted to the action of the heat which is applied beneath the pan. The pan is provided with doors for charging and discharging, and with an outlet in the cover for carrying off the vapours to a condenser.

The invention relates, secondly, to the construction of condensers for condensing oily vapours evolved from retorts or distilling apparatus.

3117.—Philip Albert Muntz, of Keresley, near Coventry, Warwickshire, gentleman, for "*Improvements in the manufacture of metal tubes.*" Patent dated Dec. 5, 1865.

This invention consists in manufacturing metal tubes by first casting short thick hollow tubes, flattening and elongating the said tubes, and finally opening out, and at the same time directly converting, the said flattened tubes into cylindrical tubes, by passing them through rolls provided with semicircular grooves in cross section, or opening out the flattened tubes without the formation of pins or webs, by means of rolls having semi-elliptical grooves arranged in the manner described, and making the elliptical tubes into cylindrical tubes by passing them through rolls provided with semicircular grooves in cross section.

3153.—Piarron de Mondésir, engineer in the High Roads Imperial Body, Paul Lehaitre, civil engineer, and Augustin Jullienne, engineer in mechanics, all of 60, Boulevart de Strasbourg, Paris, in the empire of France, for "*An improved mode of applying the compression of air for ventilating purposes, and the compression of any gas for hurrying along elastic fluids in conveying-pipes.*" Patent dated Dec. 8, 1865.

This invention consists in applying for ventilating purposes the moving force of compressed air, darted or impelled through the centre of a conveying-pipe of a much larger size than the central stream of compressed air, and also in applying a stream or jet of any compressed gas for hurrying or driving along elastic fluids in conveying-pipes by means of certain apparatus described. The compressed air used is taken from a suitable receiver, in which it is previously produced by any kind of motive power-engine, working forcing pump, or pumps. It has been ascertained by successful experiments that the speed of the column of air set in motion in the conveying-pipe is giving by the following formula:—

$$u = A\frac{d}{D\sqrt{p}};$$ in which u is the speed of the moving stream or jet, d the diameter of the outlet-tube through which the compressed air escapes, D the diameter of the conveying-pipe, p the number of atmospheres of pressure of the compressed air, A a coefficient proceeding from the relation of the length to the diameter of the conveying-pipe. Therefore by modifying either the pressure or the relation of the diameter, one may obtain in the conveying-pipes currents of various velocities. Further, it is evident that the apparatus may be applied either for exhausting, or sucking in, or for forcing out, as may be required, so that it can be used either to extract vitiated air, smoke, dust, or any deleterious miasmas, or to force pure atmospheric air from out of doors into any hall or compartment. When the apparatus is used to ventilate or introduce fresh air into a room, the cold arising from the letting off (*détente*) of the compressed air is communicated to the bulk of air hurried along, and cools it. This cooling effect may be increased at pleasure, without greatly increasing the rapidity of egress of the compressed air, by merely lessening the diameter of the suction-pipe.

The apparatus working with either an exhaust or sucking, or with a forcing action, may be applied, firstly, to the ventilation of hospitals, barracks, theatres, exhibitions, dancing and music halls, or any large apartments; secondly, to the ventilation of mining galleries, tunnels in course of perforation or digging, and to unhealthy works or workshops of any kind; third, to the ventilation of ships, either to supply the hold, between decks, or cabins with air, or to rapidly carry off the smoke of powder from the batteries of men-of-war; fourth, to the purification of cesspools, sewer-pits, or water-closets provided with ventilating-pipes, and for increasing the draught of chimneys or fire-places, by directing a jet or stream of compressed air in the said chimneys or funnels; fifth, it may be applied to the blowing machines of furnaces by introducing into the wind-pipe a small tube, through which a jet of compressed air or any combustible gas will issue or start out; sixth, to hurry or drive along lighting gas in the conveying-pipes by means of a jet or stream of compressed gas, either to replace wholly or in part the forcing power of gasometers or gasholders, or in lieu of the extracting or compressing apparatus in actual use to force gas as it evolves from the retorts, and through the purifying and washing and other apparatus used in producing it.

The claim is for applying the compressed air, firstly, to ventilation in general, by bringing pure air into places where many people are assembled or thickly tenanted; secondly, to purifying purposes, or to expelling

smoke, dust, or any unhealthy gas from similar places; thirdly, to increasing the draught of chimneys and the blast or combustible power of blowing-machines; fourthly, to hurrying along lighting gas by compressed hydrogen, as previously described, related, and enumerated.

3214.—ALFRED VINCENT NEWTON, of 66, Chancery Lane, London, mechanical draughtsman, for "*An improved construction of tool for cutting tubes.*" A communication. Patent dated Dec. 12, 1865.

This invention relates to a tool which is intended for the purpose of cutting boiler tubes to a proper length, either before putting them in their places, or after putting them in and fastening one end. It is constructed of a bar or shaft with a hole bored through its longitudinal centre to receive the tightening screw, and with a stationary and shifting cone in combination with an expanding sleeve, or any other suitable expanding device, in such a manner that, by the act of the tightening screw on the shifting cone, both ends of the sleeve are expanded, and the bar or shaft can be secured or guided in a tube in a central position ready for the operation of cutting. The cutters are secured in a head which is keyed or otherwise secured on the shaft, and which is provided with a true face beyond which the cutters are set the required distance, so as to determine the depth of the cut, and to obtain a uniform feed with or without a positive motion.

3222.—WILLIAM BROOKES, of 62, Chancery Lane, in the co. of Middlesex, civil engineer and patent agent, for "*Improvements in turbines for obtaining motive power, applicable also to raising and forcing fluids, and to propelling ships or vessels.*" A communication. Patent dated Dec. 13, 1865.

One of the principal causes of loss of power which takes place in these receivers is the speed which pressure imparts to the fluid; the changes in section and in speed produce eddies and loss of power which do not take place when the fluid acts by pressure at a low speed. The application of the latter mode of action constitutes one of the improvements which form the object of this invention. This is effected by giving to the wheel only a great velocity, and imparting to the fluid a feeble motion in order to reduce the loss of power to a minimum. With this object, the fluid is prevented from participating in the motion of the wheel, and is not permitted to come in contact with it until the moment it presents itself to the edge of the floats. This is effected principally in elevating turbines and rotary pumps by means of a fixed shield, which conducts the liquid from the inlet-pipe to the floats without permitting it to receive any rotary motion from the disc. A second shield prevents the water of the chamber participating in the rotation of the disc. The inclined surface of the floats thus create a slow motion, which causes the water to pass from the suction-chamber into the other chamber, and at the same time transmits to it a slight impetus in the direction of the rotation; but the contact being of very slight duration and extent, this impetus is unimportant, and it will be moreover utilized to increase the motion of the liquid in the circular tube from which the outlet-pipe branches. The chamber increases in section in proportion to the amount of delivery to be effected at each point from the commencement of delivery to the outlet-pipe. This tube or pipe, instead of being cylindrical, forms the commencement of a conical conduit progressively increasing in section.

3248.—THOMAS PARKER, of 42, Saint Mary Axe, in the City of London, clerk to Messrs. Charles Albert Pellas and Co., of the same place, merchants, for "*Producing an oxyhydro-magnesian light, applicable to photographic purposes, to lighthouses, and to other illuminations.*" A communication. Patent dated Dec. 15, 1865.

This oxyhydro-magnesian light consists of a new process for producing an intense, bright, and constant light, applicable to photographic purposes, to lighthouses, and to other illuminations. The process whereby this light can be obtained is founded upon the following scientific principles:—First, the infusibility of oxide of magnesium at the very highest temperature. Second, the property that the said oxide has of being volatilized, but in the smallest quantity, at a very high temperature, so that it can stand and keep for a long while even in a flame of oxygen and hydrogen mixed together, and without imparting any colour to that flame. Third, the property that the same oxide has of spreading, on being placed within the flame of the said combination of oxygen and hydrogen gases, an intense, bright, and constant light, and which is admirably suited to nocturnal photography, to lighthouses, and general illuminations. Fourth, the property that the spongy oxide of magnesium has of being the best of all magnesian oxides to produce the oxyhydro-magnesian. Spongy oxide of magnesium is prepared by exposing at such high temperature as is produced by burning together oxygen and hydrogen gases, many magnesium salts, and particularly chloride of magnesium and carbonate of magnesia, which, on being decomposed at such high temperatures, turn into spongy oxide of magnesium.

3261.—SAMUEL WHITEHOUSE, the elder, SAMUEL WHITEHOUSE, the younger, JEREMIAH WHITEHOUSE, and WILLIAM WHITEHOUSE, all of Dudley, Worcestershire, engineers, for "*Certain improvements in the means of collecting waste gases arising from blast-furnaces.*" Patent dated Dec. 18, 1865.

The object of this invention is, by the means hereinafter explained, to collect for utilization the waste gases which arise from blast-furnaces, and which are now commonly allowed to escape from the top of the furnace into the outer air, whereby so much valuable product is wasted. According to this invention it is proposed to enclose the whole of the top of the furnace, and by the means hereinafter explained, to prevent any escape of the inflammable gases through what are technically known as the "filling-holes," and which said holes are apertures constructed in the furnace for the purpose of feeding it with mineral as required. In this manner the whole of the gases may be collected for the purpose for which they may be afterwards designed. Upon a ring in the inwall bricks of the furnace top they place a cylindrical dome of wrought and cast iron, rising about 6 feet above the top of the furnace. This dome is made with cast-iron circle flanges screwed or riveted together, and wrought-iron plates riveted to the said circle flanges, the said dome being constructed in segments, so that upon any part being injured by the heat of the furnace or from any other cause, it can be renewed without it being necessary to renew the whole. It is at present customary merely to shoot the mineral through an aperture or apertures made for that purpose in what has been hitherto the "tunnel-head" of the furnace, but, according to this invention, at the bottom of the dome, and even with the top of the furnace there is introduced at certain distances round the top of the furnace iron tubes or pipes going downward into the furnace to the depth of 5 feet or 6 feet. These filling-pipes may be of any convenient number, and of any desired shape and size, and, as will be readily understood, are for the purpose of furnishing the necessary supply of mineral to the furnace. The furnace being kept continually supplied it is evident the gases cannot escape as hitherto through the filling-holes. The said tubes or pipes may be of either wrought or cast iron, and are so fixed that, supposing one to become damaged, it can be easily taken out and another one supplied in a few hours. The spaces between the said filling-pipes naturally form flues to conduct the gases into the dome, and when the said gases arrive at the top of the dome they are carried away from thence by means of a T-pipe affixed thereto, or by any other convenient method.

3264.—JOSEPH HARCOURT, of Birmingham, Warwickshire, lacquer manufacturer, for "*A new process of lacquering and finishing metal goods, such as gas-fittings and other like articles, usually finished by bronzing and lacquering.*" Provisional protection only obtained. Dated Dec. 18, 1865.

This process consists in incorporating with ordinary lacquer (such as that composed of gum dissolved in spirit, and used for protecting the bright surface of metal work) black lead for producing a black lacquer, or bronze, the same being used in the ordinary way of applying lacquer to metal surfaces. With 1 gal. of lacquer, is mixed 1 lb. of seed-lac, 1 lb. of shellac, 1 lb. of gamboge, 1 lb. of sandarac, 1 lb. of benzoin, and 1 lb. of black lead, varying the proportions as may be preferred.

3268.—HENRY PLANCK, of the city of Manchester, in the co. of Lancaster, dentist, for "*Improvements in apparatus for regulating heat obtained by the combustion of gas.*" Patent dated Dec. 18, 1865.

This invention consists of an improved apparatus for regulating the heat obtained by the combustion of gas by the expansion and contraction of mercury at different temperatures. The apparatus consists of an arrangement of parts, in which a diaphragm is employed for regulating the heat in the manner above mentioned, by means of which any temperature below the boiling-point of mercury can be maintained with accuracy, and the apparatus can be used for any purposes where such an uniform temperature is or may be required.

3272.—JOHN WRIGHT CARR, residing at Newland Hall, in the parish of Roxwell, in the co. of Essex, for "*Producing and applying rotating motion by means of an apparatus to be worked by fluids, steam, compressed air, or by water or by gas.*" Patent dated Dec. 19, 1865.

In performing this invention a drum, cylinder, or case, fitted upon a shaft, or forming part of a shaft, revolves within a larger drum, cylinder, or case, and from the internal drum a fixed projection extends as far as the inner surface of the external drum. From the external drum two or more valves or slides pass close up to the external surface of the internal drum. These valves or slides are moveable, and are pressed forward or withdrawn either by eccentrics or by cams and levers. Steam, water, air, oil, or gas, is allowed to enter by means of pipes or openings to press upon any or upon all parts of the valves or slides. From the internal drum steam, water, oil, air, or gas, is admitted either by passing through a part or the whole of the shaft, or through part of the internal drum, or through both shaft and internal drum, so as to occupy the space between the external drum and the internal drum, and to press upon the projection of the internal drum, which pressure causes the internal drum to revolve within the external drum, and to communicate motion to the shaft. The egress of the steam, air, oil, or gas, is provided for by permitting it to pass through a part or the whole of the shaft, or through both the shaft and internal drum. The apparatus is applicable for all purposes of imparting motion.

3285.—JOHN GIBBON, manager of the Canneline Oil-Works, Tryddyn, Flintshire, for "*An improved retort for distilling or extracting products from cannel coal, shale, or schist, and more especially from the small coal or dust technically known as slack.*" Provisional protection only obtained. Dated Dec. 20, 1865.

This invention consists in applying self-acting feed and discharge apparatus to a revolving cylindrical wrought or cast iron retort, and constructing the inner surface of such cylindrical retort with a projecting ridge, which encircles the interior of such retort in a spiral manner, the same as the interior of a female screw, and which ridge may be either cast upon or riveted on such internal surface, and is so arranged for the purpose of causing the material to be operated upon to advance from one end of the retort to the other; this it will do of itself as the retort revolves, by following the course of the spiral screw or worm formed by the projecting ridge.

3287.—JOSEPH JOHN HARRISON, of Broughton, Lancashire, C.E., and EDWARD HARRISON, of Balham Hill, Surrey, gentleman, for "*An improved mode of and apparatus for purifying and deodorizing impure air, whether in buildings, ships, mines, or sewers, which improvement is also applicable for ventilating purposes.*" Provisional protection only obtained. Dated Dec. 20, 1865.

This invention consists of a chamber, receptacle, or box, having any desired form or configuration, and so arranged that portions of carbon, charcoal, or other disinfectant may be contained within it upon open shelves, through which air can freely pass; or the bottom of the said chamber supporting the disinfectant must be perforated, and so constructed that air may have a free passage through such perforations into and amongst the carbon, charcoal, or other disinfectant placed therein; the circulation of the air may be thus effected. Upon the top of the said chamber or box, a little above the disinfectant, a lamp is placed, which, when burning, heats or rarefies the air in the immediate neighbourhood, which has the effect of creating a draught or current through the said chamber or receptacle containing charcoal, which thereby purifies the air by its contact with such charcoal, and renders it thoroughly pure and wholesome. The requisite current of air may also be created by the employment of a fan, air-pump, or other equivalent placed in the same posi-

tion as the lamp before mentioned, and driven by means of a coiled spring or other mechanical equivalent.

3292.—WILLIAM CLARK, of 53, Chancery Lane, in the co. of Middlesex, engineer and patent agent, for "*A new and improved apparatus for cooling and purifying air in rooms or compartments, and ventilating the same.*" A communication. Patent dated Dec. 20, 1865.

The object of this invention is the production of a current of air and the purifying and cooling of the same in a room or compartment without any mechanical agency. The apparatus consists of a box in which the air is first dried by passing through or over lime, or other drying and disinfecting materials, and so caused to circulate upward through an ascending conduit preparatory to being cooled by cooling materials, and then to pass down a descending conduit, from which it is delivered in a pure state.

3296.—JOHN WATSON, of Kildale, Cleveland, Yorkshire, and Lombard House, George Yard, Lombard Street, and JOHN PLAYER, of Norton, Stockton-on-Tees, Durham, engineer, for "*Improvements in obtaining oil and other products from bituminous shale.*" Provisional protection only obtained. Dated Dec. 20, 1865.

This invention has for its object the application of heat, as hereafter described, to bituminous shale in large quantities, whereby the volatile and gaseous products are thrown off; and afterwards, by passing them through suitable condensers, oil and other products are obtained therefrom. For this purpose the shale to be operated on is placed in a suitably constructed chamber, kiln, or furnace, and although the form may be varied, it is preferred to be of a form similar to that of a blast-furnace; the exterior is best constructed of sheet-iron, and the interior with a lining of fire-bricks, or of other suitable materials. The lower part of this chamber is provided with openings, by which the shale, after the oil has been exhausted, can be removed, and also other openings by which air or gases may be introduced. The upper part of the chamber is provided with a suitable opening or openings through which the shale to be operated on can be introduced through double locks or valves, as is well understood. In those cases where the shale requires fuel to cause it to burn, the requisite quantity is fed in to the chamber mixed with the shale. From the upper part of the said chamber is an opening into a pipe or tube, through which the volatile products flow by reason of a partial vacuum being formed by means of a steam-jet, exhausting cylinder, or fan, or any other suitable means. The products, after passing through the exhauster or past the steam-jet, are caused to pass through a series of metal pipes, or other suitable condenser, and the greater part deposited in a fluid state. The uncondensible gaseous products are allowed to escape from the condensers, and are used as may be required either for heating the shale in the chamber or other vessels, or for rectifying the fluid products obtained.

3303.—GEORGE DAVIES, of 1, Serle Street, Lincoln's Inn, in the co. of Middlesex, and of 87, St. Vincent Street, in the city of Glasgow, civil engineer and patent agent, for "*An improved gas-burner.*" A communication. Patent dated Dec. 21, 1865.

This improved gas-burner consists of a hollow conical projection having one or more openings in the side, a cap having corresponding openings (also in the side), and a lip having in the top the usual aperture or apertures for the egress of the gas, according to the form of jet required, the whole being constructed substantially as described hereafter, so as to regulate the amount of gas which passes through the burner, and thus prevent the waste of gas by servants and others careless in its use. The base of the hollow projection is provided with a screw-thread on the upper end of the supply-pipe. On the upper conical or taper part of the former is fitted a cap closed at the top, and having a hole or holes in the side corresponding with the opening or openings in the conical projection, so that when this cap is in one position the gas passes freely through the opening or openings, and a free supply is allowed to pass through; but upon turning round this cap the opening or openings is or are partially closed, and thus the supply of gas is diminished. The lip which forms the jet passes over and encloses both the hollow projection and the cap, and is provided at its base with an internal screw-thread adapted to an external screw-thread on the former, and this lip is secured so firmly in its place as to require considerable exertion and the employment of a suitable instrument to remove it, the adjustment of the cap by unauthorized persons being thus rendered a matter of some difficulty.

3314.—EDWARD DEANE, of Arthur Street, London, for "*Improvements in pipes, tubular columns, and hollow structures for masts, oars, shear legs, lifeboats, and ordinary boats, for water, gas, and waste water pipes, and for other similar constructions where great strength is required.*" Patent dated Dec. 22, 1865.

This invention consists in constructing pipes, tubular columns, and such other hollow structures of sheet iron, or steel, or any other suitable metal, in such a manner as to add very greatly to their strength. The tube may be round, square, oval, or of any other shape to suit the purpose for which it is intended, and may be made of sheet-iron or other suitable metal, having a web or webs of similar material in its interior. These are bolted or riveted in the usual way to each other, and to the external tube, either on the inside of the tube or to flanges on the outside. There may be any number of webs, but two, three, or four will be generally found sufficient. Instead of constructing in the interior of the tubular structure above referred to a tubular, a solid core may be used, which becomes the axis from which radiating stays may proceed, the said stays being securely fastened to the external tube. If found desirable, there may be a number of such cores and radiating stays.

3315.—WILLIAM JACKSON, of Lancaster, in the co. of Lancaster, engineer, for "*Improvements in pumps.*" Patent dated Dec. 22, 1865.

That part of this invention which relates to improvements in house and force pumps applicable to ordinary purposes consists of a cylinder with its valves, one to each suction-pipe, which are two in number, though only one may be employed if preferred. Each pipe is provided with a tube. The piston-rod is tubular, for the purpose of acting as a delivery-tube, and to this is attached a spout. Above the piston-rod are mounted in carriers, upon the piston-rod, small friction-rollers, and above these again the piston-rod continues in a solid form, and is received in a socket screwed into the head of the case, which serves to maintain the perpendicularity of the action.

3317.—GEORGE DAVIES, of 1, Serle Street, Lincoln's Inn, London, civil engineer, for "*Improved apparatus for burning combustible vapour (such as that from naphtha or coal oil) for heating, cooking, and lighting purposes.*" A communication. Patent dated Dec. 22, 1865.

This invention relates to burners for the combustible vapour of gas given off from naphtha, coal oil, or other similar liquids, when decomposed by the action of heat, and consists, firstly, of a vapour-burner adapted for heating and culinary purposes; and, secondly, of a modification of the same, adapted for the purpose of illumination.

In carrying out the first part of this invention, a portion of a straight tube, near to the end, is bent horizontally into a ring, the end being then bent downwards, and communicating, by means of a short horizontal pipe, with a chamber, to the top of which is screwed a nipple, the latter being directly or nearly below the centre of the ring formed by the bent portion of the tube above referred to.

In carrying out the second part of the invention, the chamber, valve-seat, and screwed rod, are adapted to the end of the supply-pipe, a vertical tube passing downwards from the chamber, the lower end of the said tube being surrounded by a tubular ring, connected thereto by two or more hollow arms, the upper side of this ring being pierced with a number of small perforations.

3328.—EDMUND DWYER, of Hornsey, and HENRY MOON, of Hoxton, both in the co. of Middlesex, for "*A new or improved method of, and apparatus or machinery for, applying water or other fluid as a motive power.*" Patent dated Dec. 23, 1865.

This invention consist of a method of constructing carriages to be propelled by hydraulic pressure, through or by means of a novel arrangement of mechanism, the details of which are not given apart from the drawings attached to the specification.

3330.—HENRY DAVIS HOSKOLD, of Cinderford, in the co. of Gloucester, mining engineer, and WILLIAM BLANCH BRAIN, of Forest of Dean, in the same county, mining engineer, for "*Improvements in pumps.*" Patent dated Dec. 23, 1865.

This invention consists in constructing, as hereafter described, a double-acting pump, chiefly intended for mining purposes, but also applicable for use in water-works, fire-engines, feeding-boilers, and other purposes. The pump consists of a ram or plunger enclosed in a working barrel or cylinder. Near the centre of the cylinder a partition divides its length into two chambers. In or on this central partition is fitted a stuffing-box and gland, through which the ram works; or, instead of a stuffing-box and gland, a simple partition or close joint is formed. There is an opening in the side of the barrel, opposite the gland or partition, closed by a door or lid, making both chambers of the barrel air and water tight, with regard to each other and to the external atmosphere. The ram is attached to a rod which passes out of the working-barrel or cylinder at one end and is connected to the motive power. The ram is of sufficient length to reach from the far end of one chamber, through the gland or partition in the centre of the working barrel or cylinder, just into the other chamber, so that when set in motion by the motive power the one chamber fills at the same time that the other discharges, and a continuous stream of water is consequently produced. By this arrangement, with the required number of valves, suction and discharge pipes, a double-action pump is obtained, or a combination of two distinct and separate acting pumps in one.

3333.—CHARLES WOODWARD MOORE, of 12 and 13, Little Earl Street, Soho, Middlesex, for "*Improvements in cocks or valves.*" A communication. Provisional protection only obtained. Dated Dec. 23, 1865.

This improved arrangement of cocks and valves consists in providing a valve with an elastic seat, operating similarly to an ordinary poppet or check valve, and rotating key working an eccentric in its rotation. The pressure of the water or fluid is behind or on the top of the valve, and tends to press it on an elastic seat; consequently it is always tight.

3345.—JAMES YOUNG, jun., of Limefield, in the co. of Mid Lothian, N.B., gentleman, for "*Improvements in treating hydrocarbon oils.*" Patent dated Dec. 27, 1865.

This invention relates to the treatment of certain hydrocarbon oils, such as those obtained from the distillation of coal or shale at a comparative low temperature, and known as paraffin oils; or such as petroleum, either crude or more or less refined, with a view to the reduction of the specific gravity of such oils, and otherwise to the beneficial alteration of their properties.

In the preparation of these oils it is desirable for commercial purposes that the proportion of heavy oils to the lighter or burning oils should be as small as possible, on account of the greater demand for burning oils; but in the processes hitherto employed, the production of heavy oils has been unavoidably large, to the great detriment of the manufacturer. This invention applies alike both to the heavy and light oils, rendering both lighter and improving their quality, but its importance is greater as applied to the heavy oils.

In carrying out this invention the hydrocarbon oil to be operated upon is run into any convenient boiler or distilling vessel; which, to insure safety should be made of sufficient strength to resist a pressure of at least 100 lbs. to the square inch, the heat being applied thereto in the usual manner. The oil contained therein is thereby converted into vapour, which may be allowed to pass to the condenser under any desired pressure, and such pressure may be regulated by means of a valve loaded to the extent of pressure required. The compressed vapour, or volatile product of distillation, may be allowed either to pass through such valve, or through a separate tube with regulating stop-cock, to the refrigerator or condensing apparatus, where the products are collected in the usual manner. An ordinary steam pressure-gauge may be employed for the purpose of indicating the pressure. The result of this process is that a large proportion of the oils originally operated upon are converted into oils of lower specific gravity. It is found in practice that a pressure of about 20 lbs. to the square inch in the boiler, or vapour-generating vessel, is suitable for the treatment of heavy hydrocarbon oils obtained from coal or shale, but such pressure may be varied to some extent.

The apparatus employed may be of various forms, but it is found that an ordinary steam-boiler, not tubular, answers the purpose efficiently. The more capable it is of being easily cleaned the better, as the heavy deposits should be removed therefrom at intervals; such deposits, if allowed to remain, seriously interfering with the process of distillation.

The vaporizing or distilling under pressure may also be applied to the before-mentioned hydrocarbon oils in various stages of rectification. For instance, the crude oil or first product of distillation may be at once treated, or the crude oil may be first distilled in the usual manner, and the product of such redistillation may be treated according to this invention. Or the products of distillation may be separated into two portions, and the heavier of such portions may be treated according to this invention; but it will be found, in all cases, that the result of this process is to convert the hydrocarbon oils, in whatever state they are operated upon, into oils of a lighter nature.

APPLICATIONS FOR LETTERS PATENT.

2014.—William Jackson, of Birmingham, in the co. of Warwick, engineer, for "*A new soufflating accumulating pump or hydraulic engine.*" Aug. 4, 1866.

2023.—Ralph Medcalf, of Bow Lane, in the City of London, engineer, and William Nicholls, of Bow, in the co. of Middlesex, pattern maker, for "*Improvements in couplings or connexions, particularly adapted for coupling or connecting gas, water, and other pipes.*" Aug. 6, 1866.

2025.—John Hamilton, of Glasgow, in the co. of Lanark, N.B., merchant, for "*Improvements in artificial material for producing gas for illuminating purposes.*" Aug. 6, 1866.

2047.—James Turner, of Fleming Road, Walworth, in the co. of Surrey, gas-meter maker, for "*Improvements in wet gas-meters.*" Aug. 9, 1866.

2059.—Charles Foster Cotterill, of Cannock, in the co. of Stafford, gentleman, for "*Improvements in the manufacture of earthenware and other pipes, and in machinery or apparatus to be employed in the said manufacture.*" Aug. 10, 1866.

2064.—John Edward Keirby, of Parker Street Mill, Manchester, in the co. of Lancaster, india-rubber merchant, for "*Improvements in packing for steam, water, air, and gas tight joints.*" Aug. 11, 1866.

2067.—John Israel Ensley, of the city of New York, in the state of New York, U.S.A., for "*An improved apparatus for manufacturing illuminating gas, and producing bone black and other valuable residuum.*" Aug. 11, 1866.

2072.—Désiré Marchal, of Brussels, in the kingdom of Belgium, civil engineer, for "*Improvements in the combustion and prevention of smoke, and in increasing the heating power of fuel.*" Aug. 13, 1866.

2096.—Charles Brown, of 43, Mark Lane, in the City of London, gas engineer, for "*A new or improved apparatus for consuming smoke from gas and other lamps.*" Aug. 15, 1866.

GRANTS OF PROVISIONAL PROTECTION.

1820.—Charles Edward Austin, of 7, Broad Sanctuary, Westminster, in the co. of Middlesex, civil engineer, for "*Improvements in apparatus applicable to sewers and drains, for separating the fluid and solid parts of sewage.*" July 11, 1866.

1854.—Alexander Roger Stark, engineer, and James Woodman, commercial agent, both of Woolwich, in the co. of Kent, for "*Improvements in the means of fixing the covers of gas-retorts,*" July 16, 1866.

1866.—William Edward Gedge, of the firm of John Gedge and Son, of 11, Wellington Street, Strand, in the co. of Middlesex, patent agent, for "*An improved gas-burner.*" A communication. July 17, 1866.

1955.—Charles Denton Abel, of 20, Southampton Buildings, Chancery Lane, in the co. of Middlesex, patent agent, for "*Improvements in apparatus for regulating the supply of water and other fluids to steam-boilers and other receptacles.*" A communication. July 28, 1866.

NOTICES TO PROCEED.

941.—Edward Brooke, the younger, of Huddersfield, in the co. of York, manufacturer of sanitary tubes and other fire-clay goods, for "*Improvements in the construction and arrangement of apparatus and material for effecting the deodorizing of noxious gases arising from sewers and drains, and for the more effectual ventilation of such sewers and drains.*" April 2, 1866.

982.—William Henry Phillips, of Nunhead, in the co. of Surrey, engineer, for "*Improvements in rotary pumps.*" April 5, 1866.

992.—James Young, of Limefield, in the co. of Mid Lothian, N.B., for "*Improvements in distilling.*" April 6, 1866.

1382.—Walter Payton, of 70, Sewardstone Road, Victoria Park, in the co. of Middlesex, for "*Improvements in the construction of dry gas-meters, part of which improvements is also applicable to meters for measuring water and other liquids.*" May 15, 1866.

Parliamentary Intelligence.

HOUSE OF LORDS.

Monday, August 6, 1866.

The Glasgow Corporation Water Bill received the Royal Assent.

Tuesday, August 7.

The Imperial Gas Company (No. 3) Bill, was returned from the Commons, with the amendments agreed to.

Friday, August 10.

The Imperial Gas Company Bill received the Royal Assent.

HOUSE OF COMMONS.

Monday, August 6.

The Imperial Gas Company (No. 3) Bill, was agreed to, as amended by the Lords.

Legal Intelligence.

WESTERN CIRCUIT.

Bristol, Tuesday, Aug. 14.

(*Before Justice* Blackburn *and a Special Jury.*)

DONALD AND ANOTHER *v.* THE CONTINENTAL GAS AND WATER COMPANY.

Mr. Karslake, Q.C., and Mr. Cole, were counsel for the plaintiffs; and Mr. Coleridge, Q.C., and Mr. Bullen, for the defendants.

Mr. Karslake, in opening the case, said the plaintiffs were James Donald and Robert Wilson, who carried on business in Scotland and in Fenchurch Street, London, as engineers and contractors, and the defendants were the Continental Gas and Water Company, Limited, and the action was brought to recover damages for breach of an agreement, whereby certain securities were given to the plaintiffs for work done in erecting gas-works in Port Louis, Mauritius. It appeared that the Continental Gas and Water Company was formed in the year 1863, for the purpose of obtaining concessions to put up gas and water works in different towns in France and elsewhere. In 1864 the plaintiffs were in negotiation with the municipality of Port Louis, in the island of Mauritius, for the concession and contract for lighting the town with gas, and the defendants, thinking it would be a valuable contract to them, proposed to take the concession off the plaintiffs hands on certain terms, and an agreement was entered into between them on the 23rd of May, 1864, by which the plaintiffs assigned the contract to the defendants, but the plaintiffs were to carry out the works necessary to be done on terms which were agreed upon, and the plaintiffs were to receive a considerable sum of money under the contract, which money was to paid partly in debentures and partly in bills. The amount of bills to be given them was £23,070, and, it being inconvenient when they became due for the company to pay them, certain articles of agreement, under which that action was brought, were framed and executed. Those articles gave the company increased powers to borrow, but he believed it would be shown that the company had already exceeded their powers of borrowing. The articles of agreement were read by the learned counsel, and it appeared that the company gave the plaintiffs three several bills for the debt owing them, and agreed that half of all money received by the company, and all moneys received by the issue of mortgage debentures, subject to a deduction from the gross amount of any sum required to be expended on capital, not exceeding in the whole £11,000, should be specially applied to the payment of the said bills of exchange. The plaintiffs said that such moneys had not been so applied, and it was for the breach of that agreement, and to recover the amount due to them, that they had now brought their action. The contention of the directors was that under the agreement they were entitled first to pay off an old debt due from the directors themselves as well as from the company, to the extent of £25,000, to the Imperial and Mercantile Credit Association.

Justice Blackburn, interposing, remarked that whatever might be the result of the action, it struck him that there must ultimately be a question reserved for the Court of Queen's Bench as to the determination of the construction of the deed, and he inquired whether it would not be well if Mr. Karslake were to state the whole of the special case, supposing the figures and facts were agreed on.

Mr. Karslake said that there had already been an attempt at settlement.

In accordance with his lordship's suggestion, a consultation took place, and ultimately a verdict was taken by arrangement for the plaintiff for £5000.

DONALD AND ANOTHER *v.* ROMANES.

This was a similar case, the defendant being one of the directors of the company. Verdict for the plaintiff for £5000.

SHERIFFS COURT.—Saturday, Aug. 11.

(*Before Commissioner* Kerr.)

SPALDING *v.* THE EAST LONDON WATER-WORKS COMPANY.—THE WATER SUPPLY AND THE PUBLIC.

This was an action of the very highest importance, especially so at the present time, in which the plaintiff sought to recover £5 damages, alleged to have been sustained through the defendants refusing to supply him with water until he had paid a certain sum of money due to the company by another person. The facts are perfectly novel, never having arisen before. It appeared that, when the plaintiff took possession of a certain house, the water supply had been cut off by the defendants, and, as the Act of Parliament, known as the Water-Works Act, sets out that the rate must be paid in advance, plaintiff waited upon the company with a half year's rate, and requested that the water might be laid on. The company declined to comply with this request until a sum due to it for arrears by a former tenant were paid. Plaintiff declined to pay these arrears until serious consequences were likely to ensue through the absence of a proper water supply, and then he paid the money under protest. He now sought to recover damages from the company, and at the original hearing the question was fully argued by himself, and Mr. Philbrick for the company, his honour reserving judgment until to-day.

This morning, Commissioner Kerr delivered judgment as follows: This is an action by the plaintiff as an occupier of a house, within the area supplied with water by the defendants, against the defendants, for refusing and delaying to supply the plaintiff with such water. The defendants have admitted the refusal, and the tenders alleged by the plaintiff have been proved. The plaintiff relies upon the 43rd and 53rd sections of the Water-Works Clauses Act, 10th Vic. cap. 17. The 43rd section imposes upon water companies a penalty of 40s. per day, to be paid to every person who had paid or tendered the water-rate for every day that the refusal to supply the water shall continue. The 53rd section gives the occupier a right to demand a supply, upon the payment or tender of the rate. The defendants relied upon the 74th section of the Act, which empowered the suppliers to stop the water from flowing into such premises, as the occupiers neglected to pay the rates. The company contended, in fact, that if any tenant of a house fell into arrears, that house should remain without water, even in the occupation of another tenant, so long as the arrears were unpaid. I have given my best attention to the words of the section, but they do not appear to me to justify the interpretation which has been put upon them. Every separate clause of it may be interpreted to refer to the particular tenant or occupier who has made default in paying his rate. To hold otherwise would be to repeal the 53rd section, which, as I have already stated, gives to the occupier a right to a supply of water. It may be said that there is a hardship in calling upon the defendants to supply water to a person of whom they know nothing; but this is not so, for the 70th section gives the water company a right to payment in advance. It is entirely their own fault if they incur any loss whatever. The verdict of the court will be for the plaintiff.

The verdict was then entered for the plaintiff, with costs.

LEEDS COUNTY COURT.

WEDNESDAY, AUG. 15.

VICKERMAN *v.* THE LEEDS NEW GAS COMPANY.

Mr. HARLE, solicitor, was for the plaintiff; and Mr. MIDDLETON, barrister, for the defendants.

Mr. Vickerman is a shoemaker, living in Leeds, and the action was brought to recover compensation for damage done by a gas explosion in his house in consequence of the defective state of the New Gas Company's pipes. It appeared that on the 31st of May last, when plaintiff returned from his employment in the evening, he detected a strong smell of gas in his house. He at once turned off the gas at the meter, and opened the windows to allow the gas to escape. When he thought it had had time to escape, the windows were again closed. When, however, he had got his supper and was going up to bed, an explosion took place, and inflicted some damage on his goods and premises, and it was for compensation for such damage that the present action was brought. Immediately on the explosion taking place, Mr. Vickerman sent down to the old gas company, from whom he received his gas, requesting them to send a gas-man to examine the place, and to make the necessary repairs. A man was accordingly sent, and on examination he found that the escape of gas into Mr. Vickerman's house was from the main pipe belonging to the New Gas Company, and that the gas had percolated for some distance through the ground, and through a wall into plaintiff's house. Information was then sent to the New Gas Company; a new pipe was immediately put in, and the defect remedied.

Mr. MIDDLETON, on behalf of the defendants, stated that both gas companies had pipes in the same localities. His clients did not deny that the escape of gas was from their pipes, but he contended that it was owing to circumstances over which they had no control. The pipes were laid eight years ago, and had been working satisfactorily ever since up to the present time; therefore it was reasonable to suppose that they had been properly laid in the first instance, and that there could be no charge of carelessness or defective workmanship in the laying of them. The specific cause of the escape was, that about three years ago a drain had been made by the Leeds corporation underneath these pipes, and the constant traffic over them had in some way disturbed them, and caused the damage in which the explosion had originated. Mr. Middleton further contended that the fact of these pipes working satisfactorily for three years after this drain had been made, was an additional proof of the efficiency of the work.

His HONOUR ruled that, under the circumstances, the defendants could not be rendered liable, inasmuch as the injury to the pipes had been caused by work done by other parties who ought to be held responsible.

The plaintiff was accordingly non-suited.

Miscellaneous News.

RATCLIFF GASLIGHT AND COKE COMPANY.

The Ordinary Half-Yearly Meeting of the Shareholders of this Company was held on Thursday, the 9th of August, at the Company's Offices, Back Road, E.—JOSEPH HENRY GOODHART, Esq., in the absence of the chairman of the company through indisposition, presiding.

The SECRETARY read the notice convening the meeting, and the corporate seal of the company having been affixed to the shareholders register, the following report and statement of accounts were submitted:—

The directors have much pleasure in submitting the accounts of the company, as certified by the auditors, for the half year ended June 30, 1866.

The contractors are still engaged in the erection of the steam-lift, and gasholder, referred to in the last report, but the progress made therewith has not been satisfactory. The directors are urging the necessity of strenuous efforts to complete the same at an early date, in order that the company may be in a position to meet the contemplated increase in the consumption of gas in the coming winter. In other respects the works have been maintained in an efficient state of repair.

The directors have availed themselves of the borrowing powers, granted by the extraordinary meeting of shareholders of the 23rd of May last, to the extent of £10,900, and considering the high value of money the amount has been secured on equitable terms.

During the session, a select committee of the House of Commons was instructed to inquire into the operation and results of the Gas (Metropolis) Act, 1860, at the instance of the corporation of the City of London, when this company acted in conjunction with other metropolitan gas companies for the protection of your interests.

The available balance of profits enables your directors to recommend that a dividend upon the paid-up capital of the company, after the rate of £5 per centum for the half year ended June 30, 1866, less income-tax, be now declared, payable on and after the 10th day of October next.

Dr. *Trade Account, for the Six Months ended June 30, 1866.* *Cr.*

To Directors allowances	£	400	0	0	By Gas-rental	£14,414	0	3
Salary of secretary and clerks		390	0	0	Less bad debts and allowances	96	9	11
Collectors commission and pay		197	8	0		14,317	10	4
Rents, rates, and taxes of offices		31	9	10				
Stationery, printing, and general charges		187	15	8	Public lighting and under contracts	2,059	15	3
Payment to auditors		15	15	0	Rental of meters	4	19	0
Coals, including carriage, dues, &c.		9,290	3	7	Sale of old materials	24	13	0
Purifying materials		326	17	8	Coke	3,008	0	4
Supervision and labour		3,173	12	6	Breeze	179	3	1
Tools and implements		152	14	7	Tar	546	4	11
Ordinary repair and maintenance of premises		787	6	1	Ammoniacal liquid	88	0	0
Rents, rates, and taxes of manufactory		604	5	6	Miscellaneous receipts	51	12	10
Distribution—ordinary repair and maintenance		171	2	4				
Meters — restoring and replacing		2	3	6				
Law & parliamentary charges		168	0	0				
Net profit		4,261	18	2				
	£	20,279	18	9		£20,279	18	9

The CHAIRMAN said: Gentlemen, you have heard the report read, and I hope it is satisfactory to you. I do not see that there can be any occasion for lengthened comments, because it speaks for itself. I can assure you, as one of the directors, that it is a perfectly truthful and faithful report. We have had the benefit of examination by our auditors of the accounts, and they testify to their accuracy. The report tells you that the contractors had undertaken to do a large amount of work, which was to be finished by the 1st of August. We are now upon the 9th, and the work is not concluded, nor is it likely to be for a month or two. The money upon the bonds issued was required for the purpose of paying for the gasholder and lift. The contractors have asked for some money, which we have declined to give them, inasmuch as they have not complied with the terms of their contract. While I am upon that subject, allow me to say that the sum we have received from our shareholders is £10,900, so that we have been ready to pay according to the terms of the contract, although, in consequence of their delays, we have not paid anything on account. We have placed upon deposit a large portion of that money at 6 per cent. The lift is nearly ready to work, and I think when it is completed we shall derive from it very great benefit. The parliamentary expenses have been great, but the other companies have paid more. We made an arrangement by which we were to pay according to our respective rentals, and according to that arrangement our portion was £168. The dividend we propose to pay you in October; we cannot pay it before without going to our bankers to borrow money at 10 per cent., and the shareholders have stated on a former occasion that they were content to wait rather than that we should do so. We hope that in October the rental that is due to us will be paid, and that we shall divide the profits out of our own money. We are in great hopes that when we get the lift at work and the gasholder in full operation the distribution of gas will be greater, and that our rental will be larger; and I can only assure you that though we have not reduced the price, we are very anxious and desirous so to do, but we are not in a position to do it. We are obliged now to draw upon our reserve to give you the dividend we have, and we do not give it to you as we did formerly, because we deduct the income-tax. Gentlemen, having made these observations, I move the adoption of the report and accounts, and shall be happy to answer any questions which may be put to me.

Mr. WILSON: I second the motion.

Mr. FAIRCLOUGH: Sir, as one of your auditors, I can bear testimony to the very able and very correct way in which your accounts have been kept. Everything as usual upon that score is of a most satisfactory character. But as we drew towards the close of the audit, we found one important item which struck us with some feeling of regret—it was the amount carried to net profit. That amount this year, as read by our secretary, amounts to £4262. The profit for the like period of 1865 was £6942, and for a similar period in 1864 £6201, making this year as compared with last a deficiency of £2700, and £2000 with the year 1864. Naturally we looked for the cause, and we found with few exceptions that the items of the receipts and expenditure were very much like those of the former year. There was certainly an increase in the gas rental of some few hundred pounds over last, and £1000 over the preceding year. There was a deficiency on the coke return of about £400 as compared with last year, and £100 on the former year. Other items were very nearly alike, and the total very nearly alike. But on looking to the opposite side of the account, we found we were debited coals to the amount of £9290 against £7357 in the corresponding half of the previous year. This is a very large and very important item. An expenditure of £9290 in coals, and a return of only £16,376, is unlike anything that has been accomplished by this company during the last three years, and unlike anything accomplished by other companies. I have here an extract from a work with which you are all cognizant, and which gives the return of last year, and with the exception of two companies on the metropolitan list, I find that others have greatly exceeded the cost of their coals. Therefore, there must be here some cause which I think we ought to know, because many of the companies are not obtaining more than 4s. per 1000 feet, and some even have less than that for their gas. It is a matter of great importance to find this in making up our accounts, because it strikes me that we might in some legislation in the future be considered only as trustees for the public, instead of a proprietary body; and if we do not show better figures than these it may tell very much against our future position.

The CHAIRMAN: Mr. Fairclough, I assure you this is a subject which has given the directors a great deal of anxiety for a length of time. We see other accounts in the shape you have pointed out. We admit there is a great falling off in our products according to the quantity of coal carbonized; we are most anxious about it, and have been endeavouring to find it out. At the present moment it is under inquiry by the board, and it will be investigated, we hope, by a proper and fit man. We have called our engineer's attention to it; and, as I think he is in the room, I shall be very pleased indeed to call upon him to explain how it is that the quantity of coal carbonized has yielded so small a return. We have nearly 2000 tons of coal this year presumed to be carbonized from which we get no result.

Mr. W. G. WILTON (the engineer): I think, Mr. Chairman, I have explained that in my report.

The CHAIRMAN: I do not think so.

Mr. WILTON: I admit it is worse than last half year, but it is not the worst half year the Ratcliff Company has had. The fact is, the coal is not so good. We were fortunate in 1862 in having a first-rate gas coal, but the last half year the coal has given a less product. Another difficulty we have to contend with is in the distribution of gas—viz., the size of the main under the London Docks, which was laid many years ago. The proper way to arrive at the profit is to bring all the items under one or two denominators, and the result will be as follows:—In 1861, the rental for every £100 expended in coal was £175; 1862, £206; in 1863, £128 10s.; in 1864, £205; in 1865, £188; and the last half year it is £176. In 1861, the rental per ton of coal was £1 12s. 9d.; in 1862, £1 16s. 1d.; in 1863, £1 10s. 7d.; in 1864, £1 12s. 1d.; in 1865, £1 10s. 6d.; and in the first six months of 1866, £1 10s. 4d.

The CHAIRMAN: I am very glad that Mr. Fairclough has brought this subject before you, and that I have given the engineer an opportunity of giving his explanation. He has done so in his own way, and I think that is more satisfactory than hearing the report which he has laid before the directors. We do not hesitate to tell you that we have had for some time a strong conviction that we did not get the results we ought; and we are going to call in a gentleman of great experience to look over our accounts and our works, to see the products we have made; and I hope at our next meeting we shall be able to tell you what that report is, and that it will be much more favourable than the present.

The resolution for the adoption of the report and accounts was carried unanimously.

Mr. BADDELEY (a director): I beg leave to move—"That a dividend for the half year ended June 30, 1866, upon the paid-up capital of the company, after the rate of 5 per centum, less income-tax, be now declared, payable on and after the 10th day of October next."

Mr. WILSON seconded the resolution, which was carried unanimously.

A SHAREHOLDER: Permit me to inquire whether any steps have been taken to compel the contractor to finish his work.

The CHAIRMAN: I can only say that the contractor was here with us last week, and, having sufficient money at the bankers to pay him, I told him, in the presence of my brother directors, that if he would undertake to finish this work in a month he should have £3000 on account. He said he could not do it in a month; that trade had been very much disturbed by the strikes, and his calculations thrown out completely. However, he has promised us faithfully that it shall be done by the 1st of October. The lift, I am told, will be at work on Saturday next. There are some penalties attached to non-completion.

Mr. SAUNDERS: How far have the works advanced?

The CHAIRMAN: The lift is nearly finished.

Mr. WILTON: The lift will be at work in about a week, and it will take two months to complete the other works.

Mr. PADDON: I rise to propose—"That the thanks of the meeting be presented to the directors for their services during the past half year." I am quite sure that they have done the best they could for the company, and I believe the proprietors present will be very anxious about the investigation that is to take place in the next half year.

Mr. J. BADDELEY (shareholder): I second that.

The resolution was carried unanimously.

Mr. WILSON: Gentlemen, on behalf of my brother directors and myself, I beg to thank you for the vote just now passed. I can assure you we are sensible of all that has been said by the auditor. We feel that we ought not to be different from other companies; and I do trust that when we meet again the accounts will show you a much larger balance than they have done this half year. If they should not, the simple fact is that we cannot pay you 10 per cent. I am sure that the lift, which will be completed as you have heard, so soon, will be a great boon to us, and the gasholder, when finished and in operation, will be a source of additional revenue. Our great source of revenue should bear some proportion to what we expend in coals. Your engineer, who is present, knows that I have mentioned this to him many times, and he has told us that the main underneath the London Docks is the cause of the falling off. It is a very extraordinary cause, because that main has been there for years. If that be so, we shall have a very good answer in the report that we shall have to lay before you from the gentleman who is going to examine our works. I trust the investigation will be such that it will tend to satisfy your directors and you.

Mr. STONE: I beg to move—"That the thanks of the meeting be given to the auditors for their valuable services in investigating the accounts of the company;" and I think the meeting is indebted to Mr. Fairclough for bringing before them such matter as he has done.

The resolution having been seconded, was unanimously carried, and suitably acknowledged by Mr. FAIRCLOUGH.

On the motion of Mr. FAIRCLOUGH, a vote of thanks to the secretary was carried for the very able manner in which he at all times transacted the business of the company.

The SECRETARY, in acknowledging the vote, said: Mr. Chairman and gentlemen, I am again deeply indebted to you for the kind notice you have been pleased to take of my services. I can assure you it is always an anxious time to me to ascertain how the accounts will turn out. On this occasion they have not resulted quite so satisfactorily, but no efforts have been wanting, or will be wanting, on my part, to endeavour to discover the causes which have so led to the difference.

A vote of thanks to the chairman for his able conduct in the chair concluded the proceedings.

GAS PRODUCTS UTILIZING COMPANY, LIMITED.

The Fourth Ordinary General Meeting of this Company was held at the London Tavern, Bishopsgate Street, on Friday, August 10—ALEXANDER ANGUS CROLL, Esq., in the chair.

Mr. GUYATT, the secretary, having read the advertisement convening the meeting, the following report for the past half year was presented:—

The directors have much pleasure in again meeting the shareholders, and placing before them a statement of the affairs of the company for the six months ending 30th of June last.

The directors have adopted the usual course in the audit of the accounts, the balance-sheet now presented being verified by Messrs. Quilter, Ball, and Co., and the auditors appointed by the shareholders.

The result of the half years working, after deducting all trade charges and the very exceptional item of £254 for bad debts, shows a balance of £4725 14s. 8d. available for division.

From this sum the directors propose and recommend the payment of a dividend at the rate of 10 per cent. per annum, free of income-tax. This will require the sum of £3060 2s. 6d., and will leave a balance of £1665 12s. 2d., which the directors propose to add to the reserve, increasing that account to £5940 1s. 9d.

In common with other trading companies, the stringency of the money market has affected the profits of this company; but notwithstanding this drawback, the directors are gratified at being able to continue the usual dividend, and at the same time to raise the reserve to nearly £6000.

It will be remembered that it was originally contemplated to write off the preliminary expenses at the rate of 20 per cent. per annum, so as to liquidate the whole of those charges in five years. This resolution has been adhered to up to the present time, including the past six months; but the directors think it desirable to write off the balance of this account from the amount of the undivided profit, and, if this suggestion is approved by the meeting, the item of preliminary expenses will disappear from future balance-sheets, and the amount of undivided profit will be £5126 9s. 3d.

The balance-sheet of the Glasgow business has been duly audited there by Messrs. M'Ewan and Guild, and the profit vouched for by them. The result of the working of this branch of the company's business is still satisfactory; and when the additional processes intended to be carried on there are in operation, which is expected early next month, the directors confidently anticipate a largely increased return from these works.

The new works at Bow are now complete and in operation, and the directors fully expect that these additional works will add materially to the future profits of the company.

There still remains a considerable liability in respect to the payment of the purchase-money of the Glasgow property and the new works at Bow, and the best mode of meeting these payments has occupied the attention of the directors.

It was contemplated, and stated by the chairman at the meeting held in February, that, in addition to the call then made, a further sum of about £10,000 would probably be wanted, and this amount the directors find will be required during the next six months, and they therefore propose to raise it by making a call of £1 per share upon the present shares, payable on the 1st proximo; to issue 2500 additional shares at par *pro ratâ* amongst the present shareholders, calling £1 per share upon these additional shares; and in about three months to make a further call of £2 per share upon the first issue, making them fully paid. These operations will give a reserve of £22,500, to be called as required upon the 2500 shares now to be allotted, but it is not anticipated that any further call will be required to be made upon these additional shares for at least twelve months; and the directors trust that these recommendations will meet with the unanimous approval of the shareholders.

The resident manager thus reports upon the condition of the works:—

Bow Common, August 9, 1866.

To the Directors of the Gas Products Utilizing Company, Limited.

Gentlemen,—I have the pleasure to report that the new extensions are now complete and in full operation, and that the whole of the apparatus is in most efficient condition.

I am, gentlemen, your obedient servant,

(Signed) J. CHAPMAN, Resident Manager.

The CHAIRMAN, in moving the adoption of the report, said: Gentlemen, I think you will admit with me, that it is not necessary to say much to recommend the adoption of this report. On occasions like the present, it is well sometimes to look back a little to the early stages of a concern; and, in reference to this company, when it is remembered that at the close of the first six months of our operations we were enabled not only to pay a dividend of 10 per cent., but to place to our reserve-fund the sum of £1000; that during the next six months this sum was increased to £2000; during the subsequent six months to £4274; and that now it amounts to close upon £6000—I say when we remember these facts, we have the best possible indication of the growing prosperity of our affairs that we could desire. There are two or three points touched upon in the report respecting which I wish to say a word. The first has reference to the way in which we propose to meet the the indebtedness of the company. I dare say you will recollect that we almost sketched out the probability of our recommending upon this occasion the division of a large portion of the reserve-fund. Of course, circumstances do change intentions, and the fearful crisis of the money market has decided us to alter our determination upon this point. Had the price of ammonia been maintained, instead of having a surplus of £1635 after payment of a dividend of 10 per cent., we should have had a balance of considerably larger amount; but in consequence of the effect of the continental war upon our operations, especially with reference to the shipment of ammonia, we have now a very large stock of this commodity on hand, amounting in value to many thousand pounds, and it is really a large sum, but then you will remember we are engaged in carrying on a very large business. When I tell you that, independently of our stock at Nine Elms and Glasgow, we have in our vitriol-chambers at Bow Common, under ordinary circumstances, between 700 and 800 tons of acid; and that, in the mere process of manufacture, we have never less than £2000 worth of alum in stock, you will hardly be surprised at the large stock referred to. The great bulk of our stock consists of sulphate of ammonia, muriate of ammonia, and patent ammonia. If the demand for these particular articles had continued, and they had been converted into cash, we should be able better to part with our profits out of the business; but to divide the surplus profit now would only be to increase the necessity for augmenting the capital in another way. Now, inasmuch as the new shares are to be offered to the present proprietors *pro ratâ*, so that they will get all this additional interest in the undertaking, the directors thought, looking at the whole of the circumstances, it would be well not to divide the reserve-fund as they had intended, but to maintain it entire. There is another matter mentioned in the report, and that is the item of "bad debts." These works have been in operation for 24 years, and throughout that period I never remember to have made a bad debt before. I am told that probably we might succeed in getting payment of the amount stated in the accounts, but as it would involve the necessity of a suit in Chancery, we think it better not to run the risk, and we are gratified in being able to wipe it off out of the profits of the past half year. The other matter which I desire to call your attention to, is the fearful epidemic raging in the neighbourhood of the works. We had intended, as you know from the notices that were sent round, to hold the present meeting at Bow Common; we promised the shareholders also a luncheon on the occasion, and had actually given instructions to provide it, but in consequence of several of the shareholders not being so intimately acquainted with the nature of the epidemic as affecting the company's works, it was suggested to us that it would be better to hold the meeting in the City as usual. As regards the works themselves, it is very pleasing to us, as I am sure it will be pleasing to you, to know that there never has been a case of cholera there, either on this visitation, or on the last, or on the earlier appearance of the pestilence in our country. But, gentlemen, it has occurred to us that, though we have not had occasion to regret the deaths of any of our men, we ought to exhibit a fellow-feeling for those who have been suffering in that district of the metropolis; and we should like very much to suggest to the shareholders the propriety of sending a donation of £50 to the London Hospital. (Cheers.) It is certainly much better to make a thank-offering than a peace-offering; and, if you approve of the suggestion, the directors will have much pleasure in being your almoners to that extent. (Hear, hear.) At our last meeting, thinking that to-day we should be receiving you at the works, I said I would give you a brief description of the articles we manufacture. As we are not able to be there, Mr. Guyatt has done the next best thing he could do, and has placed upon the table samples of the raw materials employed by us, and of the products manufactured from them. The first specimen on the table is sulphuric acid. That we obtain from different sources: first, from sulphur, of which we have here also a sample, and which is a well-known article; secondly, from pyrites (one of the specimens is iron pyrites; the other contains a small quantity of copper); thirdly, from the sulphuretted hydrogen evolved in the process of manufacturing sulphate of ammonia; and, fourthly, from spent oxide of iron. In employing sulphur, we simply obtain sulphuric acid, there remaining no residual product; the whole is converted into acid. In the case of the copper pyrites, when delivered at the works they contain about 2½ per cent. of copper, but, after the sulphur has been expelled, the 2½ per cent. is converted into 6 per cent., and this residue is sent to Swansea for the extraction of the copper. In the case of the iron pyrites, we extract the sulphur in the usual way, and, by treating the residue with sulphuric acid, it is converted into sulphate of iron. Some of the pyrites we employ are the brasses which are found in the coal measures, which the manufacturers of gas should be careful to get rid of when delivered with their coals, for this it is which produces the bisulphide of carbon so much complained of. If the gas companies were a little more particular in picking out these brasses from the coal, they would have less complaint of the presence of bisulphide of carbon in the gas; and it would pay the companies ten times over to give a good price to their men to pick them out. We make from these pyrites, first, sulphuric acid, and, from the residuum, sulphate of iron; and, by adding to the latter lime in proper proportions, oxide of iron is obtained, which, as is well known, is used in the purification of gas, as patented by me now nearly twenty years since. We hear a great deal about oxide of iron—the uncertainty in its use and the price paid for it, having regard to its object, viz., the purification of gas. If the companies, however, would purchase their oxide of iron upon analysis, instead of as now by weight or measure, they would save themselves a great deal of trouble, and secure much more satisfactory results. Here is a specimen of oxide of iron which has been employed in the purification of gas, and which contains the largest possible quantity of sulphur it can hold. This spent oxide is placed by us in a furnace, by which means we extract the sulphur from it. The other source of sulphur is the sulphuretted hydrogen evolved from the liquor of gas-works, by its being saturated with acid. It is an exceedingly disagreeable and dangerous gas, and, instead of allowing it to escape, it is conducted in closed pipes into a furnace, and from thence to the sulphuric acid chambers. Respecting our operations for this purpose, Professor Taylor remarks: "I have never met with a more complete scientific process for disposing of noxious effluvia, and turning them to profitable purposes." And Dr. Letheby's report states: "On the 25th of November last, I visited Mr. Croll's works, at Bow Common, for the purpose of examining in detail the process which he uses for the treatment of ammoniacal liquor of gas-works, so as to insure the *complete utilization of its constituents*, without causing annoyance to the neighbourhood. At the time of my visit the works were in full operation; the ammoniacal liquor in large quantity was being subjected to the action of steam, and thence to the absorbing power of dilute sulphuric acid. The residual gas was carried to the sulphur furnace of the vitriol-chamber, and there it was burnt and converted into aqueous vapour and sulphurous acid, both of which were conveyed to the vitriol-chamber,

and used in the manufacture of oil of vitriol. All these operations were carried on in closed vessels, so that nothing escaped into the external atmosphere but the innocuous nitrogen, which was the residuum of the vitriol process, and to assure myself that this was not tainted with acid fumes, I collected and examined the condensed steam, through which it passed before its final escape into the air. In this manner I satisfied myself that the whole process was most complete." What then is our next process, and to what beneficial purpose do we apply this acid? In the coal measures there is an aluminous shale existing more or less above the coal, which protects the pits from falling in. In some pits it is found that to enable them to get the coal they are obliged to bring this aluminous shale to the pit's mouth. All that is necessary for us to do is to place the shale in rows and ignite it, there being sufficient carbon to keep it burning, and we then obtain the material now exhibited, which is sufficiently porous for the acid to act upon it. It is placed in convenient vessels, the sulphuric acid is applied in proper proportions, the mixture brought up to a temperature of 220°, when the acid combines with the alumina of the shale, and every ton of shale produces two tons of alum. During the whole of this process there is no evaporation; the alumina is simply dissolved out, and when cool produces the crystals now before you. We have here a specimen of the alum of commerce, which we obtain in blocks of about 4 tons weight for sale. There are two kinds of alum manufactured at the works—ammonia and potash; the latter being principally used in the manufacture of satin white and the best colours, and the former in paper making, in addition to other domestic purposes. It is necessary to crystallize alum in order to get rid of iron and other impurities, but provided we could get rid of these impurities or make it from an article which does not contain them, the crystallization would be unnecessary and the whole expense of the ammonia for that purpose would be done away with. A great many attempts have been made to accomplish this. Liebig suggested that we should throw down the iron by means of ferrocyanide of potassium; but this is a very expensive process, and the solution would have to be made very weak, and we should have to evaporate a large quantity of the liquor to obtain the result. Many other plans have been suggested, but the most successful is the use of china clay as free from iron as possible. After burning this clay and adding acid to it, it is evaporated, and the mass produced is a cake, which contains a very large quantity of silica and other insoluble matters; but it is difficult to get the whole of the acid neutralized, or to make it in a state easily dissolved. It is a very concrete substance, and the manufacturers effect this object by shaving it down into thin shavings; but, in consequence of the free acid, it must be kept in perfectly tight vessels, as it is deliquescent to a very considerable extent. I have discovered, however, that by adding properly prepared china clay to sulphuric acid of a particular strength and of a temperature of 230°, an instantaneous action takes place, and the whole of the china clay is dissolved. Then by adding to this cake, before it gets cold, about one or two per cent. of common chalk, it can be made into a cake light and porous, easily dissolved, free from acid, and therefore not deliquescent, like the specimen produced; and we are now in a position to make this article in large quantities. The alum contains 24 per cent. of the water of crystallization, and 12 per cent. of sulphate of ammonia or potash, and between 10 and 11 per cent. of alumina—that which is useful—whereas this cake contains 15 per cent. of alumina, and can be produced in the instantaneous way I have mentioned. You may, therefore, easily conceive the importance to the company of this new branch of manufacture. The next specimen on the table is chloride of manganese, which, when mixed with sawdust at a high temperature and evaporated at a particular point, is employed in the purification of gas. It frees the gas from ammonia, and about 25 per cent. of the sulphuretted hydrogen it contains, and then from it we obtain the muriate of ammonia in crystals of the quality now upon the table. I may mention, in connexion with this salt, and as illustrative of the feeling that the directors have not unnecessarily extended their manufacturing operations, that an established chemical firm have built works adjoining ours for the purpose of working up this muriate of ammonia into sal ammoniac. The next is a specimen of the material after the ammonia has been washed out, and this residuum we are now selling at a considerable price per ton, having a contract with parties to take away all that we can make for the next twelve months, it being very largely used as a disinfectant, and one of the best that can be employed, having reference to its cheapness. The next material to which I have to refer is the mixture of sulphuric acid and sawdust, for the removal of ammonia from gas. Here is a specimen of the mixture. The acid being mixed with sawdust, it becomes to a certain extent carbonized, and when put into a purifying-vessel it removes the ammonia from the gas, after which we have it back, and it contains a large per-centage of ammonia, and in this state is much used as a manure. Now these are our principal products, and the sources from which we obtain them, so far as the works at Bow are concerned. I have not referred to the works at Glasgow, where we make large quantities of naphtha, and are engaged in the distillation of tar, as well as the manufacture of sulphate of ammonia and acid. I may state, however, that we are about to add to the Glasgow works the manufacture of the oxide of iron, the residuum from the iron pyrites used there being well adapted for this purpose. Gentlemen, I am much indebted to you for your patient hearing of my remarks, in which I have tried to be as brief as possible. I hope that no shareholder will be afraid to visit the works at our next meeting, when you will have a better opportunity of witnessing the various operations in process; and when I tell you that we manufacture 180 tons of sulphuric acid per week, while the other products are being manufactured upon a corresponding scale, you may form some idea of the extent of our undertaking. I now beg to move that the report and accounts submitted to you be received and adopted.

Mr. NICHOLSON seconded the motion, and said he felt much indebted to the chairman for his explanations in reference to the raw materials operated upon by the company, the *modus operandi* pursued at the works, and the nature and use of the products obtained. He only regretted that the shareholders could not have listened to the observations upon the spot. He hoped the statements made had not obliterated from the minds of the shareholders the facts of the report previously read, and, respecting that report, he expressed a wish that it had been printed and circulated before the meeting. He was glad to find the item of preliminary expenses had been wiped off at once; and he agreed with the directors as to the propriety of increasing the capital of the company, and the mode in which it was proposed to be done. He could very well understand the falling off of the revenue of the company from the exceptionally low price of sulphate of ammonia.

Mr. STARLING said he was not quite agreed as to the propriety of so largely increasing the reserve-fund at so early a period. He also took exception to the wiping off of the whole of the preliminary expenses of the company, which he considered was scarcely just to the present proprietors. He felt disposed to move an amendment upon the subject, but upon consideration he declined to press the point.

After some conversation upon the expediency of printing the report and accounts, the motion was put and carried unanimously.

The CHAIRMAN moved—"That a dividend at the rate of 10 per cent. per annum, free of income-tax, be now declared."

Mr. METHVEN seconded the motion, which was unanimously agreed to.

The CHAIRMAN moved—"That 2500 of the additional 7500 shares be now issued at par, *pro ratâ*, to the shareholders, in the proportion of their present holdings."

Mr. W. C. TAYLOR seconded the motion, which was adopted.

The CHAIRMAN stated that warrants for the dividend had been prepared, and could be had by the shareholders before leaving the meeting. He also moved—"That a donation be presented from this company to the London Hospital of £50."

The resolution, having been seconded, was unanimously adopted.

Mr. ODLING stated that, so far as he was himself concerned, he should like to see the reserve-fund increased till it amounted to £10,000. It ought to be remembered that, although the reserve-fund was not divided, yet it added to the value of their undertaking, and increased the value of their shares.

Mr. TAYLOR moved, and Mr. PURVIS seconded—"That the best thanks of the company be presented to the chairman and directors for their very valuable services."

The motion was very cordially adopted.

The CHAIRMAN acknowledged the vote, and in doing so said, although a company had very good directors, yet, unless they had good instruments to work with, they were not worth much. In fact, his experience was, that if they got a good despot, that form of government was better than any other. Mr. Guyatt was their despot, and a very good one too. He worked very hard for the company, and had a most lively interest in the success of the concern. He had, therefore, much pleasure in moving a vote of thanks to the secretary for his services.

Mr. W. C. TAYLOR seconded the motion, which was very cheerfully responded to.

The SECRETARY said he was much gratified at this renewed mark of the confidence of the proprietors, and he hoped they would have many such happy and profitable meetings as the present. He could assure them that nothing would be wanting on his part in the fulfilment of the duties of the position in which he was placed, and that his interest in the prosperity of the undertaking would receive a fresh stimulus from the conviction that the services he rendered were appreciated by the company.

The proceedings then terminated.

COMPOSITION AND QUALITY OF THE METROPOLITAN WATERS, IN JULY, 1866.—The following are the returns of the Metropolitan Association of Medical Officers of Health:—

Names of Water Companies.	Tot. solid Matter per gal.	Loss by Ignition*	Oxidizable Organic Matter.†	Hardness.	
				Before Boiling.	After Boiling.
Thames Water Companies.	Grains.	Grains.	Grains.	Degrees.	Degrees.
Grand Junction	17·49	0·70	0·60	13·0	2·5
West Middlesex	16·77	0·80	0·76	12·5	2·0
Southwark and Vauxhall	17·10	0·58	0·49	13·0	3·5
Chelsea	16·60	0·68	0·60	13·0	2·5
Lambeth	18·39	0·75	0·72	13·0	2·5
Other Companies.					
Kent	27·86	1·00	0·02	18·0	8·5
New River	17·16	0·90	0·20	13·0	3·0
East London	18·16	0·80	0·40	13·5	3·5

* The loss by ignition represents a variety of volatile matters, as well as organic matter, as ammoniacal salts, moisture, and the volatile constituents of nitrates and nitrites.

† The oxidizable organic matter is determined by a standard solution of permanganate of potash—the available oxygen of which is to the organic matter as 1 is to 8; and the results are controlled by the examination of the colour of the water when seen through a glass tube two feet in length and two inches in diameter.

HY. LETHEBY, M.B.

The analysis of the metropolitan waters during the month of July shows that in every case there is less than the average proportion of saline and organic matter; and the reduction of the latter, which is the most important constituent of drinking water, is most marked in the waters derived from other sources than the river Thames, for, while the amount of organic impurity in the latter has ranged from 0·49 to 0·76 of a grain per gallon, that of the former has been from 0·2 to 0·4 per gallon. Indeed, the quantity of organic matter in the Kent water has fallen from an average of 0·2 of a grain to 0·02; that of the New River from 0·46 to 0·2; and that of the East London from 0·53 to 0·4. These reductions in the quantity of organic matter have been mainly due to the care with which the processes of filtration are conducted; and if the analytical results are compared with those of a few years ago, the improvement is still more remarkable. It is very probable, however, that the most perfect processes of purification, so far as they can be used at the works of the water companies, will never be sufficient to ensure such a purity of water as the complete removal of those subtle agents of disease which even the most refined appliances of the chemist have failed to discover. It may well be, in fact, that all discoverable traces of organic matter may be removed from water, and yet it may contain enough of the germs of disease to manifest its morbific action over the whole area of distribution. Experience, indeed, teaches us that it is not the quantity of organic matter in water so much as its quality which determines its dangerous properties; and if it be true, as modern pathological science has almost demonstrated, that the real agents of such diseases as infectious fever, cholera, the rinderpest, and other allied zymotic maladies, are living germs, and not a gas, or vapour, or dead organic compound, it must rest with the physiologist rather than with the chemist to decide on the means which are best suited for their destruction; and it is more than probable that the chemist would be putting forward rash and dangerous propositions if, by relying upon his science alone, he ventured to dogmatize on so difficult a subject. That which has been abundantly proved in respect of small-pox and some other infectious diseases is very applicable to the present inquiry, in so far as it relates to the more than possible existence of a choleraic germ in the water we drink. The agents of those diseases are unquestionably living germs, capable of remaining dormant for an uncertain but nevertheless not indefinite period, and then springing into activity, and multiplying themselves without limit directly they find the conditions necessary for their development. But whether these germs are susceptible of oxidation, like common dead organic matter passing through its final stages of decay, is more than chemical science alone can determine. The analogies in physiology are against such a supposition, and they warn us not to receive it even as a possible fact. That which we do know, however, is that these germs are destroyed by a temperature of boiling

water; that they are killed by all caustic substances, as chloride of zinc, chloride of iron, &c.; and that they cannot resist the action of certain agents, as sulphurous acid and its salts, and carbolic acid, which act upon them in the way of specific poisons. We must look, therefore, to these agents, rather than to processes of oxidation for reliable prophylactics; and in the case before us, the only agent on which we can confidently rely is heat, for if the water be boiled, the choleraic germ will be innocuous. That the destruction of decaying organic matter in water is of the greatest importance there can be no doubt, for experience shows that it also is productive of disease. It is moreover certain that organic matter of this description is rapidly oxidized by permanganate of potash, and by filtration through animal charcoal, and charcoal mixed with certain compounds of iron; but it is more than doubtful, even if it were practicable, whether such processes of purification should be used by the water companies at the sources of supply, seeing how many causes of pollution exist between those sources and the consumer. Besides which it must not be forgotten that only a very small part of the water delivered by the companies is used for primary domestic purposes—the great bulk of it being employed for flushing closets, drains, and sewers, for watering streets, and for various manufacturing operations. It would, therefore, manifestly be a wasteful application of a tedious and expensive process to do that at the works which can be so easily and much more economically done at the point of consumption. But, after all, the most important consideration at the present time is the means of obtaining a constant supply, so that the present prolific sources of contamination and of real danger to the community—filthy butts and cisterns—may be entirely abolished. The very first step towards the attainment of this object must be made by the public themselves, for it is idle to expect a constant supply while there is the present imperfect condition of almost every household service. If it were given to us it would fail; for all the water of the Welsh hills would be insufficient to maintain it. The daily supply of water to London is at the rate of 30 gallons a head, whereas experience has proved that with a well-regulated constant service it need not exceed 20 gallons a head. As a matter of economy, therefore, as well as of public health, it is high time that the consumer should make preparation for such a supply in the way which the Act of Parliament directs, and then there would be no difficulty in applying processes of purification at every point where the water is used for domestic purposes. At the present juncture it is advisable that all water stored in butts or cisterns should be boiled before it is drunk, and where it is practicable it should be previously filtered through animal charcoal or charcoal associated with proper compounds of iron; and failing this, it may be treated with a little of Condy's permanganate of potash solution until it retains a very pale but decided rose tint. In all cases, however, it should be boiled.

THE LIVERPOOL WATER SUPPLY.—The Liverpool Town Council held a special meeting recently for the discussion of this subject, which has of late caused a good deal of attention and anxiety. Mr. Duncan, the engineer to the corporation, has reported in favour of obtaining water from the Bala Lake in North Wales, and the estimated expenditure is about £1,500,000. At present the supply of water to Liverpool is obtained from the Rivington works and from wells sunk in the red sandstone rock which underlies the town. The opponents of the Bala scheme contended yesterday that the Rivington works had already cost £2,000,000, and that the supply obtained from them, with the additional and improving supply from the wells, was sufficient for the demands of the town for seven years. If the new scheme was carried out, the Rivington works would have to be disposed of at an enormous sacrifice. It was stated, too, on this side of the question, that Liverpool had already spent far more than Manchester and Glasgow, and quite as much, in proportion to population, as London, on the water supply. On the other side it was urged that the town now contained half a million of inhabitants; that there was a very largely increasing demand for water for trading, domestic, and miscellaneous purposes; that in eight or ten years the population would be increased to 800,000, and in 20 years to 1 million; that the wisest plan in public works of this kind was to take time by the forelock; that the present area of the town embraced 60 square miles, and that in the periods mentioned this area would be very largely increased, while this increase would naturally tend to the deterioration of the existing wells. Mr. Beloe, chairman of the Water Committee, moved that Mr. Duncan's report be submitted to one or more engineers of eminence for their opinion as to its advisability, the cost of carrying out the Bala scheme, and

Share List of Metropolitan Gas Companies.

No. of Shares issued.	Amount per share.	Name of Company.	Amount paid up per Share.	Div. per Cent. per Annum.	Price per Share.
	£		£ s d	£ s d	£ s d
8000	10	Anglo-Romano . .	10 0 0	9 0 0	11 to 13
5000	20	Bahia (Limited) . .	20 0 0	4 0 0	16 10 0
1000	20	Do., preference .	20 0 0	10 0 0	27 10 0
750	20	Do., do., redeem.	10 0 0	10 0 0	12 10 0
30000	5	Bombay (Limited).	5 0 0	£5 intr.	4 to 4¼
10000	5	Do., third issue .	4 0 0	£5 intr.	3 to 3¼
10000	20	British, Limited . (Norwich, Huit-Sculcoates, Hanley, Tunstall & Shelton (Potteries), Trowbridge, & Holywell.)	20 0 0	10 0 0	28 to 28½
12000	50	*Chartered*	50 0 0	10 0 0	62 to 63
6000	50	Do.	35 0 0	10 0 0	42 to 42½
10000	20	*C. of London*, Ash.	20 0 0	10 0 0	26 to 28
10000	10	Do., B shares	10 0 0	4 0 0	7 to 7½
8000	10	Do., new shares.	10 0 0	10 0 0	12½ to 13¼
25000	25	City of Moscow (L) Colonial & General	17 10 0	£7 intr.	10½ to 12½
17490	25	*Commercial* . . .	25 0 0	10 0 0	30 to 32
5000	20	Continental G. & W.	6 0 0	6 0 0	
2500	20	Continental Union.	20 0 0	8 0 0	17 to 18
17500	20	Do.	10 0 0	8 0 0	8 to 9
5827	5	County & Gen. (L)	5 0 0		
2000	5	Do., preference . (Pater, Pembroke, Ely, Lea Bridge, Northfleet, Walton, & Ware.)	5 0 0		
5000	10	*Crystal Pal. Dist.*	10 0 0	10 0 0	13 to 13¼
5000	10	Do.	1 0 0	7 0 0	1 7 6
10000	10	Do., preference .	10 0 0	6 0 0	12½ to 13
3000	40	*Independent* . . .	40 0 0	10 0 0	60 to 65
3000	10	Do.	10 0 0	5 0 0	7 to 9
3000	20	Do.	12 10 0	7 10 0	13 to 14
6886	50	*London*	50 0 0	10 0 0	68 to 70
5519	25	Do., 1st pref. .	25 0 0	6 0 0	28 to 29
568	50	Do., 2nd pref. .	50 0 0	6 0 0	
219	50	Do., 3rd pref. .	50 0 0	6 0 0	
18781		Do., 1st pref. sk		6 0 0	
11828		Do., 2nd pref. sk		5 0 0	
4000	50	*Equitable*	50 0 0	10 0 0	70 to 72
4000	25	Do., new shares.	25 0 0	10 0 0	35 to 36
23406	10	European (Lim.) .	10 0 0	10 0 0	12½ to 12¾
12000	10	Do., new shares, Boulogne, Amiens, Rouen, Caen, Havre, & Nantes.)	5 0 0	10 0 0	6¾ to 6¾
20000	10	*Gt. Cent. Gas Cons.*	10 0 0	10 0 0	12½ to 13
5000	10	Hong Kong (Lim.)	10 0 0		8 to 10
26000	50	*Imperial*, old sh.	50 0 0	10 0 0	70 to 71
1300	100	Do., bonds . . .	£100	10 0 0	180 to 185
7000	25	Imperial Austrian.	10 0 0		
26000	50	*Impl. Continental* (Amsterdam, Berlin, Ghent, Hanover, Lille, Rotterdam, Aix-la-Chapelle, Antwp., Bordeaux, Brussels, Cologne, Frankfort-on-M., Haarlem, Stolberg, Toulouse, & Vienna	43 15 0	16 0 0	85 to 85½
		Impl. Mexican (L.)			
12000	5	Malta & Medit. (L.)	5 0 0	3 0 0	
30000	5	Oriental, Calcutta	5 0 0	8 0 0	4¾ to 5½
20000	5	Do., new shares.	1 0 0	8 0 0	¾ to 1
10000	5	Ottoman (Limited)	5 0 0		2 to 4
10000	10	Parà (Limited) . .	10 0 0	£6 intr.	9½ to 9¾
27000	20	*Phœnix*	20 0 0	10 0 0	26 to 26¾
3600	100	Do., new	15 0 0	7 10 0	14¾ to 15
144000	Stk.	Do. (capit. profits)		5 0 0	80 0 0
5000	20	*Ratcliff*	20 0 0	10 0 0	26 to 28
	20	Rio de Janeiro (L).	20 0 0	10 0 0	20¼ to 21¼
6959	5	Singapore (Lim.) .	5 0 0	3 0 0	
2000	5	Do., preference . Shanghai	5 0 0	7 10 0	
4800	50	*Sth. Metropolitan*	50 0 0	10 0 0	75 to 77
15000	10	*Surrey Consumers*	10 0 0	10 0 0	13¾ to 14
10000	10	Do., new	5 0 0	10 0 0	6 to 6¼
9000	50	United General . . (Dublin & Limerick)	50 0 0	4 12 0	28 to 30
10000	10	*Victoria Docks* . .			
3000	10	*Wandsworth & Putney*	10 0 0	7 10 0	13¼ to 14
20000	10	Western (Limited) A shares.	10 0 0	10 0 0	14 to 14¼
10000	10	Do., B shares.	5 0 0	10 0 0	7 to 7¾
10000	10	Do., C shares.	3 0 0	10 0 0	5¼ to 6
20000	10	Do., D shares.	1 0 0		1¼ to 2
8000	5	*West Ham*	5 0 0	7 10 0	6 10 0
6000	5	Do., new shares.	3 0 0	7 10 0	3 18 0
551	10	West London Junction (Lim.). .	10 0 0	6 0 0	
520	10	Do., preference .	10 0 0	6 0 0	

Price Current.

CASTINGS.—*Per Ton.*

Average Weight of Cast-iron Gas-pipes, per Yard.

1¼ in.	2 in.	2½ in.	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lb

Retail Prices are 5 to 10 per cent. higher.	London.	Glasgow.	Newcastle	Wales.	Yorkshire, Derbyshire, and Staffordshire.
	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Pig Iron, No. 1, G.M.B.	3 15 0	2 12 9	2 12 6	3 10 0	4 0 0
1¼ and 2-inch Socket-pipes	7 10 0	6 0 0	6 15 0	6 15 0	7 10 0
2¼ and 3-inch ditto	7 0 0	6 0 0	6 5 0	6 10 0	7 0 0
4 and 5-inch ditto	6 10 0	5 10 0	5 15 0	6 0 0	6 10 0
6 inches and upwards ditto	6 5 0	5 0 0	5 10 0	5 15 0	6 5 0
Retorts, 1st fusion, hot blast	8 0 0	—	5 5 0	5 10 0	6 0 0
Ditto, 2nd ditto, cold ditto	7 0 0	5 15 0	5 15 0	6 0 0	7 0 0
Tank-plates, ¼ thick and above	6 10 0	5 10 0	5 10 0	5 15 0	6 5 0

WROUGHT-IRON TUBING,

Subject to 50 per cent. Discount.

	2 in.	1¼ in.	1½ in.	1 in.	¾ in.	½ in.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Patent Welded Tubes, from 2 to 12 feet—per foot		1 0	0 10	0 7	0 5	0 4½
Ditto ditto, from 6 inches to 18 inches—each	3 0	2 0	1 9	1 3	1 0	0 9
Connecting-pieces, or Long Screws	3 6	2 3	2 0	1 6	1 2	0 11
Bends, Springs, and Elbows (wrought iron)	3 9	2 3	1 9	1 0	0 10	0 8
Tees, wrought or cast	4 0	2 6	2 0	1 6	1 1	0 10
Crosses, ditto	4 6	3 0	2 6	2 0	1 6	1 2
Iron Cocks	17 6	9 6	7 6	4 6	3 3	2 6
Ditto, with brass plug	28 0	16 0	13 0	7 0	5 6	4 6
Diminishing Sockets, Caps, Plugs, and Nipples	1 3	0 9	0 8	0 6	0 5	0 4
Plain Sockets	1 0	0 8	0 7	0 5	0 4	0 3
Syphons, 2-quart	15 0	14 0	13 6	13 0	12 0	—

GAS COALS.—*Per Ton.*

Newcastle.—Unscreened:—

East Castle, Haswells, Nettlesworth Primrose, and South Pelaw	7s. 0d.
Felling, North Pelton, Redheugh Main, Walker's Primrose, West Wear, and Whitwell Primrose	7 3
Burnhope, Craghead, Charlaw, Derwent, Edmondsley, Eighton Moor, Hartlepool Pelaw, Holmside, Lambton's Gas, Lanchester Pelaw, Medomsley, Mickley, New Pelaw, Pelaw Main, Ravensworth, South Moor Pelton, South Leverson, Townley Main, Tyne Main, West Pelaw, Wearmouth Hutton, and Witton	7 6
Peareth, Ravensworth Pelaw, Waldridge, West Garesfield, and West Pelton	7 9
Brancepeth, Dean's Primrose, New Pelton, Pelton, South Peareth, Stella, Urpeth, Washington Hutton, and West Leverson	8 0
Ramsay's Newcastle Cannel	20 0
Wigan Cannel (at Liverpool)	17 0
Scotch Cannel:—	
Boghead (at Leith)	30 0
Kirkness, best (at Burntisland)	28 6
Capeldrae, 1st quality (at ditto)	28 6
Ditto, 2nd ditto (at ditto)	18 6
Lesmahago (at Glasgow)	29 0
Ditto (at Granton)	30 0
Arniston	27 6
Wemyss	20 0
Haywood, Wilsontown (at Granton)	18 0
Pirnie	14 0
Lothian's Cannel (at Leith)	27 6
Myles' Cannel	23 6

FREIGHTS.

Coastwise—Newcastle.—Per Ton:—	
Chatham and Rochester	5s. 9d
Cork	8s. 6d. to 8 9
Dover, Folkestone, and Ramsgate	6 3
Dublin	9s. 0d. to 9 6
Exeter Quay	8 0
Ipswich	5 6
London (from Leith)	8 0
London (Pool)	6 0
Lowestoft and Yarmouth	4 6
Portsmouth & Southampton	7 0
Plymouth	7s. 3d. to 7 9
Shoreham	6 6
Whitstable	6 3
Weymouth	7 6
Foreign.—Per Keel:—	
Barcelona	£22 0s. to 23 0
Bordeaux	13 10
Boulogne and Calais	8 10
Cadiz	16 0
Cronstadt	—
Copenhagen	£7 10s. to 7 15
Genoa	21 10
Hamburg	£8 0s. to 8 5
Havre de Grace	9 5
Leghorn	21 0
Lisbon	£14 10s. to 15 0
Rotterdam	7 10
Stettin	10 0
Trieste	23 0
Venice	25 0

SUNDRIES.

Best Nstle. Fire-bks., p. 1000, £2 10s. to £2	15 0
Cliff's Fire-bks. (at Wortley), p. 1000.	2 15 0
Ingham's ditto (at Wortley), p. 1000. .	2 15 0
Fire-clay Retorts, p. ft. run, 5s. 6d. to	6 7 0
Tough Cake Copper, p. ton	81 0 0
English Pig Lead, p. ton	19 15 0
Welsh Bar Iron (in London), p. ton. .	6 15 0
Foreign Spelter, p. ton	19 2 6
English Block Tin, p. ton	85 0 0
Banca, p. ton	81 0 0
Tarred Rope Yarn, p. cwt.	1 0 0

as to how far the existing sources of supply might be largely developed; but ultimately an amendment by Mr. Clint was adopted, to the effect that the committee be empowered to employ engineering talent to investigate the local sources of supply before proceeding to the consideration of larger and more distant operations.—*Manchester Guardian.*

INJURIES TO ROADWAYS BY GAS AND WATER COMPANIES.—The Board of Works for the Holborn District, in their annual report for the past year, state that they have again to call attention to the injury done to the roadways of the district by the operations of the gas and water companies, and though the amount of repaving in this respect has not been so great as that of the previous year, it still represents a serious deterioration of the roadways in which these operations have taken place. The board more particularly refer to the circumstance that, notwithstanding they gave the respective companies timely notice of their intention to repave the carriage-way of Liquorpond Street in the spring of last year, and requested that advantage might be taken of the opportunity thus afforded of executing any repairs necessary to the pipes and mains therein, their invitation was not responded to, and they were powerless to prevent the new roadway from being taken up for the entire length of the street, within a few months of its being laid down, by one of the companies whose mains were laid beneath the surface. The board state that they can only reiterate the expression of their hope that legislative protection against so wanton a waste of the ratepayers money may be speedily afforded afforded.

THE CORPORATION SPECIAL GAS COMMITTEE.—At the conclusion of the labours of this committee during the parliamentary session, it was arranged that a summer entertainment should be given to the members and their ladies, and that as various entertainments had previously been given on board the *Maria Wood* at Richmond, Greenwich, &c., this should be given at the Crown Inn, Broxbourne. Accordingly, on Tuesday the 31st ult., their indefatigable chairman, Mr. J. F. Bontems, accompanied by as many members as could arrange to be present, spent a pleasant day, and under his presidency sat down to an excellent dinner at half-past four o'clock, in the conservatory at the entrance of the well-known beautiful grounds. The weather was, unfortunately, rather doubtful, but notwithstanding this drawback, a most agreeable day was spent. Amongst the members and visitors present with their ladies were—T. Webster, Esq., Q.C., Mr. Deputy Bone, Messrs. E. Burkitt, R. Whiteside, Stapleton, Bengough, Banister, Gover, Fricker, Cox, Rudkin, Medwin, Terry, E. Smith, Pallett, E. D. Rogers, &c.

Advertisements.

WANTED, by a South American Gas Company, a person having a thorough knowledge of, and practical experience in, all matters relating to the manufacture and distribution of gas, to act under the Engineer of the Company in the management of the works. Unexceptionable testimonials as to character and ability will be required.

Application by letter, stating views as to salary, to be made to JOHN FERGUSON, Weaver Buildings, Brunswick Street, LIVERPOOL.

WANTED, a Man accustomed to the erection of gas-works plant, to ERECT a SMALL WORK in Lancashire.

Apply to D. WEBSTER, Gas-Works, SOUTHPORT.

WANTED, a Situation as Manager of a gas-work. Is quite capable of taking the entire management; also a thorough knowledge of laying mains and services, fixing and repairing meters, and fitting houses. No objection to go abroad. Good reference.

Address, A. E. TOWLE, Westerham, KENT.

TO GAS COMPANIES.

WANTED, by the Advertiser, a Situation as WORKING MANAGER. Can set clay or iron retorts, lay mains and services, and do gas-fitting. Satisfactory reference as to character and ability can be given.

Address, B. C., 31, River Street, King's Cross, LONDON.

TO GASHOLDER & GAS-WORK FITTERS AND ERECTORS, & GAS-WORK MANAGERS.

WANTED, immediately, several efficient Men.

Apply by letter, stating wages required, and giving references, to GEO. BOWER, Engineer and Gas-Work Contractor, St. Neots, HUNTS.

WANTED, by a young Man, aged 21, a Situation as CLERK. Has been six years in Gas Companies Offices.

Address, A. B., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

TO GAS-FITTERS.

WANTED, for a small Town in the south, an experienced FITTER. No one need apply who cannot give good references both as to ability and character. Wages 26s. per week.

Address, GAS-FITTER, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a Situation as Manager of a small gas-work, or as FOREMAN of a large work. Can be well recommended for integrity, and as a good mechanic, with a practical knowledge of the routine of a gas-work. Security if required.

Address, A. B. C., 59, Holden-Street, Windsor, LIVERPOOL.

WANTED, by the Advertiser, a Situation either as INSPECTOR, ASSISTANT MANAGER, or MANAGER of a small work. Good testimonials.

Address, C. J., 23, Baxter Road, Essex Road, ISLINGTON.

WROUGHT-IRON LIDS FOR RETORTS.

In the notice of Wrought-Iron Lids, in the Fourth Edition of

CLEGG'S TREATISE ON COAL GAS, at page 101, the name of Messrs. WALKER occurs in mistake for Messrs. PIGGOTT AND SONS, who are the manufacturers of the kind of lids described.

Spring Hill, Birmingham.

METROPOLITAN BOARD OF WORKS.

THE CARRIAGE & DEPOSIT OF DANGEROUS GOODS ACT, 1866, AND THE STOREAGE OF PETROLEUM ACT, 1862.

WHEREAS, by the Carriage and Deposit of Dangerous Goods Act (1866), it is provided that the goods or article commonly known as NITRO-GLYCERINE or GLONOINE OIL shall be deemed to be specially dangerous, and that its storeage in any quantity shall be regulated by licence under the Petroleum Act (1862): And whereas the Metropolitan Board of Works is the local authority for the metropolis (exclusive of the City of London and certain dock and harbour authorities), and authorized by the said Petroleum Act to grant licences for the storage of dangerous goods: Therefore the said Board do hereby give NOTICE that applications must be made to the Board for LICENCES to receive or store specially dangerous goods, or any quantity thereof, subject to the requirements of and according to the said Statutes.

By order,
(Signed) JOHN POLLARD,
Clerk of the Board.

Spring Gardens, Aug. 10, 1866.

NATURAL

HYDRATED OXIDE of IRON constantly on Sale. Apply to

MARTYN DENNIS AND CO.,
LIVERPOOL.

TO GAS COMPANIES AND CONTRACTORS.

FOR SALE, 4 Purifiers, 9 ft. square by 2 ft. deep, with hydraulic centre-valve, by-pass valves, and 6-in. connexions, vertical condensers, with by-pass, scrubber, and washer; also a STATION-METER and GOVERNOR. The whole of the above are being removed to make room for larger apparatus, rendered necessary by the rapidly increasing business of the Company.

For further particulars, apply to Mr. A. C. FRASER, Manager, Gas-Works, COLCHESTER.

Gas Company's Office, Colchester,
Aug. 14, 1866.

FOR SALE, a set of 4 Cast-Iron Dry-Lime PURIFIERS, 10 ft. square and 3 ft. 6 in. deep inside, together with hydraulic centre-valve for 10-in. connexions, and 2 sets of cast-iron girders, 46 ft. 3 in. long, with lifting crabs.

Also a 30,000 feet per hour BEALE'S EXHAUSTER, with 8-in. Walker's valves.

A 12-in. PARKINSON'S STATION-GOVERNOR.

All in excellent order, and sold in consequence of larger being substituted.

Application to be made to the MANAGER of the Leicester Gas-Works.

TO BE SOLD, 2 new Purifiers, each 10 ft. square by 4 ft. 6 in. deep.

Particulars may be known on application at the Shrewsbury Gas-Works.

S. B. DARWIN, Secretary and Manager.

TO BE SOLD, by Private Contract, in Lots to suit purchasers, THIRTY-FIVE SHARES in the Tetbury Gas and Coke Company. Present price of gas 5s. 10d. per 1000. Dividends paid half yearly.

Apply to Mr. C. BROWN, TETBURY.

TO GAS COMPANIES AND ENGINEERS.

TO be Disposed of, by the Falmouth Gas, Coal, and Coke Company, Limited, a Cast-Iron GASOMETER-TANK, 45 ft. diameter by 14 ft. deep, in excellent condition—estimated weight about 78 tons; together with the bolts and nuts, belt-hoops, &c., belonging thereto. Now lying at Penryn, very convenient for shipment or delivery by railway.

Also with the above, or separately, the Framing and Angle Iron Curbs for a telescope gasholder to suit the above tank. Also the pulleys, chains, guide-wheels, bars, &c.

Application to be made to Mr. W. WARN, Secretary to the Company, Falmouth, Cornwall.

Dated Falmouth, June 23, 1866.

THE

GAS-METER COMPANY, LIMITED,

(LATE CROLL, RAIT, & CO.,)

Beg to intimate that the printed report of the official inspector of Gas-Meters for the City of Manchester for the year ending **1864** shows the following comparison:—

NEW METERS TESTED.

Of the Gas-Meter Company, Limited . .	Dry . .	1116	
	Wet* . .	1292	
Total			**2408**
Of George Glover and Co.	Dry	383	

* The Unvarying Water-Line Gas-Meter, in regard to which the following extract from said report refers:—"The visiting justices will perceive, from a comparison of the tables now appended with those of last year (viz., 1863), *that there has been a large increase in the number of new wet meters tested, owing to the Gas Committee having substituted the wet for the dry in the case of hired meters.*"

Extract from printed report of the said official inspector for the year ending 1862, shows the following comparison:—

Croll, Rait, and Co., per centage of error on the number tested . .	**8·671**
George Glover and Co. " " " . .	**22·727**

CAST-IRON PIPES, RETORTS, AND GENERAL CASTINGS.

Lowest current prices, quoted either f. o. b., or delivered in the Thames, on application to

THE MANAGER, MILTON IRON-WORKS, WEST HARTLEPOOL.

JAMES MILNE & SON,

GAS ENGINEERS,

Gas-Meter, Gas Apparatus, and Gasfittings Manufacturers,

EDINBURGH, AND

2, KING EDWARD STREET,

NEWGATE STREET, LONDON.

Station-Meters, Governors, Consumers Meters, Gas Lustres, Chandeliers, Brackets, &c., and every description of Gasfittings and Gas Apparatus.

MARTIN'S

LEE MOOR PORCELAIN FIRE-BRICKS,

Containing no Lime, and only ·45 of Oxides, resist the strongest heats, and will last for Gas-Works longer than any others.

Samples and prices sent, and the highest references given, on application to

MARTIN BROTHERS,

ST. AUSTELL, CORNWALL.

WALTER FORD,

159, GRAY'S INN ROAD, LONDON.

MANUFACTURER OF WET AND DRY GAS-METERS, STATION-METERS, GOVERNORS, &c. &c.

Sole Manufacturer of **PADDON'S PATENT STREET-LAMP REGULATORS,** for insuring any required consumption. These Regulators are in general and increasing use, and references can be given to Gas Companies who use them for every Lamp.

WOLVERHAMPTON RETORT WORKS.

ESTABLISHED **1840.**

JOHN EUNSON AND SON,

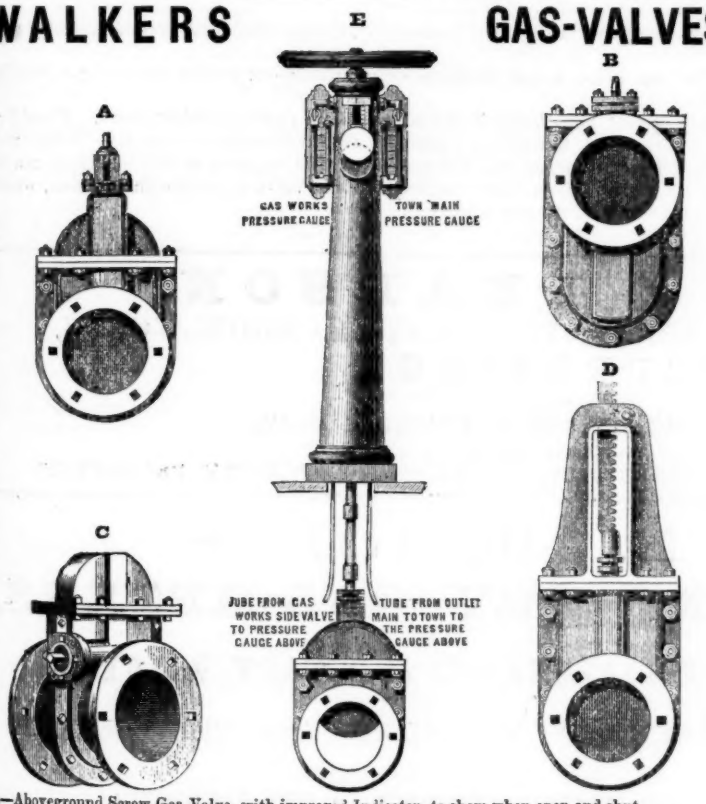
GAS ENGINEERS, AND MANUFACTURERS OF CLAY RETORTS,

AND FIRE GOODS IN GENERAL,

WOLVERHAMPTON.

Retort Mouthpieces, Bolts, Nuts, and every description of Wrought-Iron Work.

WALKERS GAS-VALVES.



A—Aboveground Screw Gas-Valve, with improved Indicator, to show when open and shut.
B—Underground Screw Gas-Valve, for shallow Street-Mains, made with or without an Indicator.
C—Internal Rack-Valve, with wrought-iron Pinions and machine-cut Teeth.
D—Ordinary Rack and Pinion-Valve, with strong, undamageable Racks and Pinions—made as shown, or boxed up for Street-Mains.
E—Regulating Indicating Column and Valve, for governing the supply of Gas to the Town.

LITTLE SUTTON STREET, LONDON, E.C.

GARSIDE'S Registered Tube-Vice and improved Main Drilling Clips may be had from the maker.

For drawings and prices apply to SAMUEL GARSIDE, Gate Field Iron-Works, ASHTON-UNDER-LYNE.

TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.

Patents completed, or proceeded with at any stage, thereby rendering it unnecessary for persons resident in the country to visit London.

Patents procured for Foreign Countries.

Information as to cost, &c., supplied gratuitously upon application to the advertiser, 4, Parliament Street, WESTMINSTER. [Office of the JOURNAL OF GAS LIGHTING, &c.]

JAMES M'KELVIE,

CANNEL COAL MERCHANT,

HAYMARKET,

EDINBURGH.

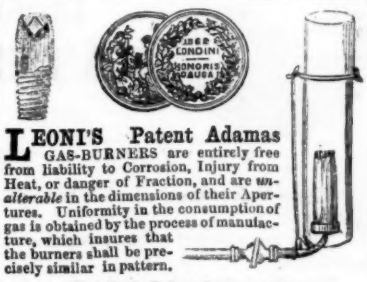
Established 1840.

EDMUND SMITH,

GRASBROOK, HAMBURG,

would respectfully call the attention of engineers and managers of gas-works to his Newly Improved GAS-METER, patented 1862 in England, and the principal parts of the Continent.

Price-lists and tenders for gas-meters, experimental station-meters, experimental holders, governors, purifiers, gasholders, pressure-gauges, gas and water fittings, &c., are forwarded on application.



LEONI'S Patent Adamas GAS-BURNERS are entirely free from liability to Corrosion, Injury from Heat, or danger of Fraction, and are *unalterable* in the dimensions of their Apertures. Uniformity in the consumption of gas is obtained by the process of manufacture, which insures that the burners shall be precisely similar in pattern.

Net Cash Price, 8s. per gross.

Patentee and Sole Manufacturer, S. LEONI, 34, St. Paul Street, New North Road, LONDON, N.

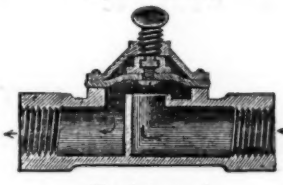
THOMAS LAMBERT & SON,

SHORT STREET, LAMBETH, LONDON.

CARTER'S SAFETY GAS-VALVES,

Made to suit every Description of Fittings.

Section of Valve open.



Manufacturers of

WROUGHT-IRON PIPES AND FITTINGS,

SLUICE-VALVES AND STOP-COCKS,

STOCKS, TAPS, & DIES,

CHANDELIERS, PENDANTS, &c.

PATENT MERCURIAL GAS-REGULATORS.

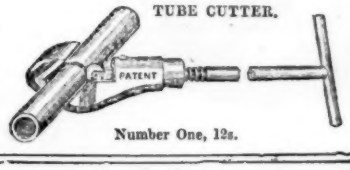
LAMBERT BROTHERS,

WALSALL,

MANUFACTURERS OF GAS TUBES & FITTINGS,

BRASS GAS JOINTS, BRACKETS, PENDANTS, &c.

TUBE CUTTER.



Number One, 12s.

LLOYD AND LLOYD,

ALBION TUBE-WORKS, BIRMINGHAM,

MANUFACTURERS OF

WROUGHT-IRON TUBES & FITTINGS,

PLAIN, GALVANIZED, & ENAMELLED, for Gas, Steam, and Water, from $\frac{1}{8}$ in. to 6 in. bore.

STOCKS, TAPS, and DIES, GUN METAL GLAND-COCKS, WATER-GAUGES, &c.;

PATENT LAP-WELDED IRON TUBES,

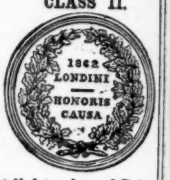
For Locomotive and Marine Boilers, &c.

LONDON WAREHOUSE—No 66, QUEEN STREET, E.C.

1862.

PATENT ANTIMONY PAINT.

CLASS II.



MADE ONLY BY

GEORGE HALLETT & CO.,

296, ROTHERHITHE, LONDON, S.E.

This Paint having been in general use over four years (especially in some of the principal Gas-Works), and proved itself the best light-coloured Paint produced for resisting the influence of vitiated atmospheres, it is important that its qualities should be more widely known.

It is not discoloured like white lead in a sulphuretted atmosphere, nor washed off like white zinc; and its light colour reflecting heat, produces much less expansion of gas in holders painted with it than with dark colours, besides rendering them much more sightly. Its specific gravity is so much below white lead that the same weight will cover one-third more surface, while it is equal in body; and its price being about the same (28s. per cwt.), it is actually one-third cheaper. From experience, its manufacture is greatly improved, and it is quite suitable for all purposes in which white lead is employed.

Reference is kindly permitted by the Engineers of the City of London, Commercial, London, and Surrey Consumers Gas Companies, who pronounce it the best Paint known for their purposes.

N.B.—Antimony Paint, COVERING SO MUCH MORE WORK, costs under 20s. per cwt., as compared with White Lead at 28s. per cwt.

EDWARD COCKEY & SONS,

IRON-WORKS, FROME SELWOOD,

PATENT GAS-VALVES.

A PRIZE MEDAL

WAS AWARDED TO THE PATENTEES AT THE INTERNATIONAL EXHIBITION OF 1862.

These Valves are formed of two cylinders, working one on the other horizontally, having their faces ground perfectly gas-tight.

They are adapted either as central valves, for two, three, or four purifiers—as bye-passes—or as inlet and outlet-valves for gasholders.

They have been fixed in some of the most important Gas-Works in the Kingdom, for more than eight years. Considerably over two hundred of them are now in use, and the most satisfactory reports of their advantages continue to be received. They are simple in construction, and not liable to get out of repair, and if in course of time the faces should leak, they can be easily re-ground and made as tight as ever, without removal from their positions. Each Valve is fitted with an index, which shows to the person in charge of the Works in what direction the gas is passing.

Frome, January 20, 1866.

E. J. & J. PEARSON,

DELPH & TINTAM ABBEY FIRE-CLAY & BRICK-WORKS,

STOURBRIDGE,

PROPRIETORS OF

BEST GLASS-HOUSE POT & CRUCIBLE CLAY;

MANUFACTURERS OF

GLASS-HOUSE POTS, CRUCIBLES, GAS-RETORTS, & FIRE-BRICKS OF EVERY DESCRIPTION.

N. DEFRIES'S

PATENT DRY GAS-METERS,

WITH

THREE DIAPHRAGMS & ROTARY VALVES,

ARE

UNIVERSALLY USED IN ENGLAND AND THE COLONIES.

The MOST LIBERAL ALLOWANCE for WET GAS-METERS in EXCHANGE for DRY.

WORKS: DIANA PLACE, EUSTON ROAD.

GAS & GENERAL ENGINEERING OFFICES,
53 FREDERICK STREET, EDINBURGH.

MR. JOHN ROMANS, Civil and Practical Engineer, may be consulted at the above address on all matters pertaining to Gas-Works, Water-Works, and other Engineering questions.

Plans and Specifications Furnished, Works Erected and Repaired, or taken on Lease for a term of years.

Mr. Romans is also agent in Edinburgh for supplying High-Classed Scottish Cannel Coal and Fire-Clay Goods.

FRASER'S PATENT RIBBED CAST-IRON RETORTS are being introduced at the Gas-Works, Derby, Shrewsbury, Portsea, Nottingham, Syston, Whitwick, Barrow-in-Furness, Seaham, Risborough, Leighton, Loughborough, Corwen, Castle Donnington, Kegworth, Royston, Woking, Swadlincote, Rugby, Carlow in Ireland, Stornoway, N.B.; also at Gibraltar and Montreal, &c.

Apply to Mr. A. C. FRASER, Gas-Works, COLCHESTER.

OXIDE OF IRON,
We are prepared to supply, on moderate terms,
HYDRATED PEROXIDE OF IRON (BOG OCHRE),
Same quality as supplied by us to several of the most extensive Gas Companies, and which has given entire satisfaction.
FRANCIS RITCHIE & SONS,
BELFAST.

INTERNATIONAL EXHIBITION,
1862. CLASS X.
PRIZE MEDAL
For excellence of Fire-Clay Gas Retorts, and "HONOURABLE MENTION" for good quality of Fire-Bricks.
WILLIAM STEPHENSON & SONS,
THROCKLEY,
NEWCASTLE-ON-TYNE,

STOURBRIDGE FIRE-CLAY WORKS.
E. BAKER & CO.,
24 WHARF, HARROW ROAD, PADDINGTON, W.
FIRE-BRICKS, LUMPS, SQUARES, and TILES of all dimensions.
GAS-RETORTS always in stock.
GARDEN EDGINGS of various patterns.
ORNAMENTAL BUILDING BRICKS.
GRATE BACKS in various designs.
Contracts entered into to set Retorts, erect Furnaces, &c.
Shipments on the shortest notice.

THOMAS CARR & SON,
MANUFACTURERS OF
FIRE-BRICKS, LUMPS, TILES, RETORTS, &c. &c.
SCOTSWOOD FIRE-BRICK WORKS,
NEAR
BLAYDON-ON-TYNE.

ADDISON POTTER,
WILLINGTON QUAY,
NEAR NEWCASTLE-UPON-TYNE,
Manufacturer of Clay Retorts, Fire-Bricks, and every description of Fire-Clay Goods.

HARRIS and PEARSON,
PROPRIETORS OF
BEST CLASS-HOUSE POT AND CRUCIBLE CLAY
MANUFACTURERS OF
FIRE BRICKS, GAS RETORTS, &C.
AMBLECOTE FIRE CLAY AND BRICK WORKS,
STOURBRIDGE.
Late in the occupation of I. and W. King. Originally J. Pidcock, Esq.
NB A quantity of best Clay Retorts in stock, viz.—Circulars, 14 inches, 15 inches. 16 inches.
D's, 16×12, 15×14, 20×16, 16×18.

HANCOCK'S INDIA-RUBBER GAS-TUBING.
All sizes, from ¼ in. to 4 in. diameter and upwards.
Also,
INDIA-RUBBER BAGS for GAS-MAINS.
WASHERS for GAS and STEAM JOINTS.
VALVES (pure solid Rubber) for STEAM-ENGINES.
PACKING (Roll or Sheet) for STEAM-ENGINES.
STRAPS (Rubber and Canvas) for DRIVING MACHINERY.
HOSE-PIPES to convey HOT or COLD WATER.
COKE-HOSE, made specially for rough usage.
GAUGE GLASS RINGS and WASHERS.
SUCTION and DELIVERY HOSE-PIPES for PUMPS, FIRE-ENGINES, BREWERIES, and FACTORY purposes.
BRASS JETS, STOP-COCKS, SPREADERS, and UNION CONNECTING-JOINTS fitted to ditto.
Illustrated Price-Lists on application.
JAMES LYNE HANCOCK,
Vulcanized India-Rubber Works,
GOSWELL MEWS, AND 266, GOSWELL ROAD, LONDON, E.C.

Trade Mark. THE MEDAL FOR 1862.
THE ONLY PRIZE MEDAL AWARDED FOR TUBES AND FITTINGS.
CROWN TUBE-WORKS,
WEDNESBURY, STAFFORDSHIRE.
WAREHOUSE—81, UPPER GROUND ST., LONDON.
JAMES RUSSELL & SONS,
Patentees and First Makers of Wrought-Iron Tubes.

W. J. HOLLANDS,
IRON MERCHANT,
31, BANKSIDE, LONDON, S.E.
SOCKET, FLANGE, HOT-WATER PIPES, AND ALL CONNEXIONS; RETORTS, HYDRAULIC MAIN, LAMP-COLUMNS, &c.; AND EVERY DESCRIPTION OF CASTINGS AND WROUGHT-IRON-WORK FOR GAS AND WATER-WORKS, STEAM, AND GENERAL PURPOSES.
N.B.—All goods kept in stock, and supplied at wholesale prices. Estimates given, and orders by post punctually attended to the same day.

BIRTLEY IRON WORKS,
CHESTER-LE-STREET,
DURHAM.
Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.
Warehouse in London for Cast-iron Pipes and Connexions of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.
Office in London, Mr. E. M. PERKINS, 78, Lombard Street.

BELGIAN CLAY RETORTS.
J. SUGG and CO., late ALBERT KELLER, Ghent.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Messrs. Sugg, of Ghent, beg to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by them. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.
Communications, addressed to J. SUGG and CO., GHENT, will receive immediate attention.

ESTABLISHED 1827.
JOHN BEVERLEY and SON,
MARK LANE, LEEDS.
Manufacturers of Patent Metallic Wet Gas-Meters, Station-Meters, Experiment-Meters, Governors, Pressure-Gauges, Syphon-Pumps, &c.
Inventors and sole manufacturers of Beverley's double-cased Gas Cooking Apparatus, unequalled in economy, comfort, and cleanliness.
Meters of any maker altered and put into complete repair, to meet the requirements of the Sale of Gas Act

ROBERT MACLAREN and CO.,
EGLINTON FOUNDRY, GLASGOW,
Manufacturers of all sizes of Cast-Iron Main Pipes, by an improved Patent. General Ironfounders, Gas Engineers, and Wrought-Iron Tube Makers.

D. BRUCE PEEBLES,
Gas-Meter Manufacturer,
FOUNTAINBRIDGE,
EDINBURGH.

BEST AND HOBSON,
LATE
ROBERT BEST,
100, CHARLOTTE STREET, BIRMINGHAM,
Manufacturers of
CHANDELIERS, PENDANTS, BRACKETS,
Brass and Iron Gas-Fittings, Steam and Water-Cocks &c., &c.
Also,
PATENT WELDED IRON TUBES,
For Gas, Steam, Water, and other purposes.
GAS APPARATUS OF EVERY DESCRIPTION.
High-pressure Water-Valves and Cocks, &c., &c.
Plumbers Brassfoundry,
BRASS, COPPER, COMPOSITION, AND LEAD TUBES.
Works: Birmingham, and Great Bridge, Staffordshire.

ALFRED PENNY, Gas and CONSULTING ENGINEER,
WENLOCK IRON WORKS,
21 & 22, WHARF ROAD, CITY ROAD, LONDON.
Mr. PENNY having had a large experience in the construction, alteration, and management of Gas-Works, begs to inform the Directors of Gas Companies that he may be consulted on all matters appertaining thereto. He also manufactures Gasholders, Purifiers, and all the various apparatus used in Gas-Works, and keeps in stock Retorts and Mouthpieces, Socket-Pipes, Bends, Branches, T-pieces, &c. &c.
Plans, Specifications, and Estimates prepared.

FREDERICK RICHARDS,
CONSULTING AND GENERAL ENGINEER.
WILMSLOW, CHESHIRE.
Plans, Specifications, and Estimates made for New or the Alteration of existing Gas-Works.
Gas-Works leased, or Estimates given for the Manufacture of Gas per Contract for a term of years.
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GAS COAL.
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This Coal is extensively used by some of the largest Gas Companies in the Kingdom.
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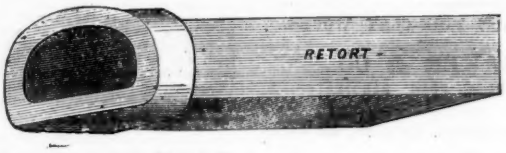

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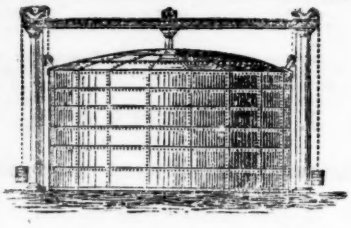

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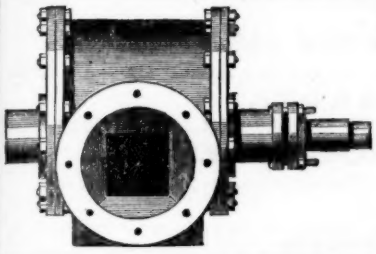

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